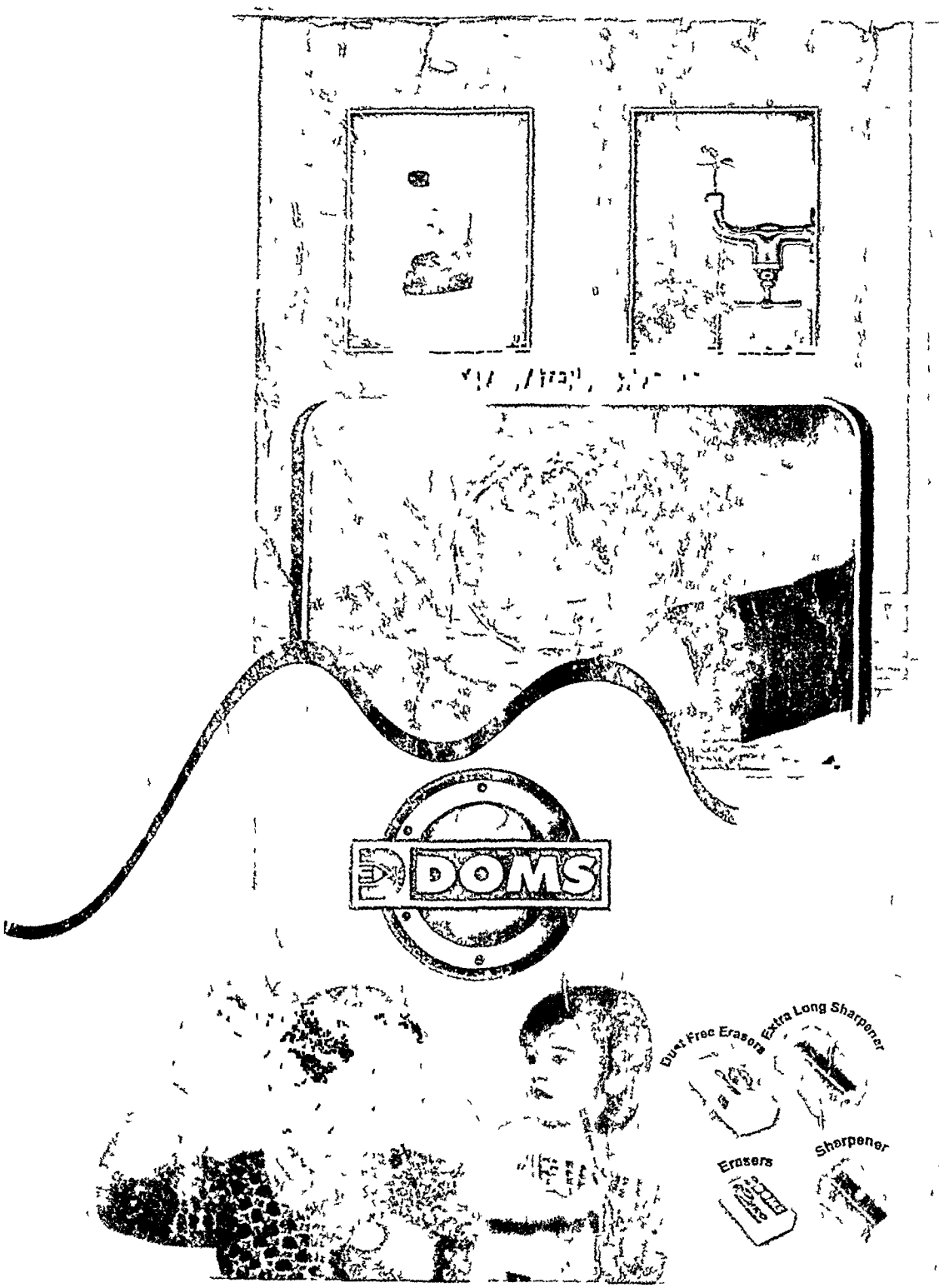

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Indications

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NASAL CONGESTION
with obstruction

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Natural Vitamin B Complex
Fortified and combined with
Essential Minerals

Formula

per tablespoonful

VITAMINS

B1 (Thiamin Chloride)	1 2 milligrams
B (Riboflavin)	668 micrograms
B6	100 micrograms
Nicotinic Acid	10 milligrams
Pantothenic Acid	268 micrograms
Filtrate (Jukes-Lepkovsky)	18 units

GLYCEROPHOSPHATES of
Calcium, Manganese, Sodium,
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Indications

Vitamin B deficiency manifesting itself by gastro intestinal malfunction, anorexia, neuritis, or restricted growth in children

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per teaspoonful

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Aminopyrine	0 06 gm
Tincture Crataegus	0 20 gm
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Vehicle q s ad	4 00 gm

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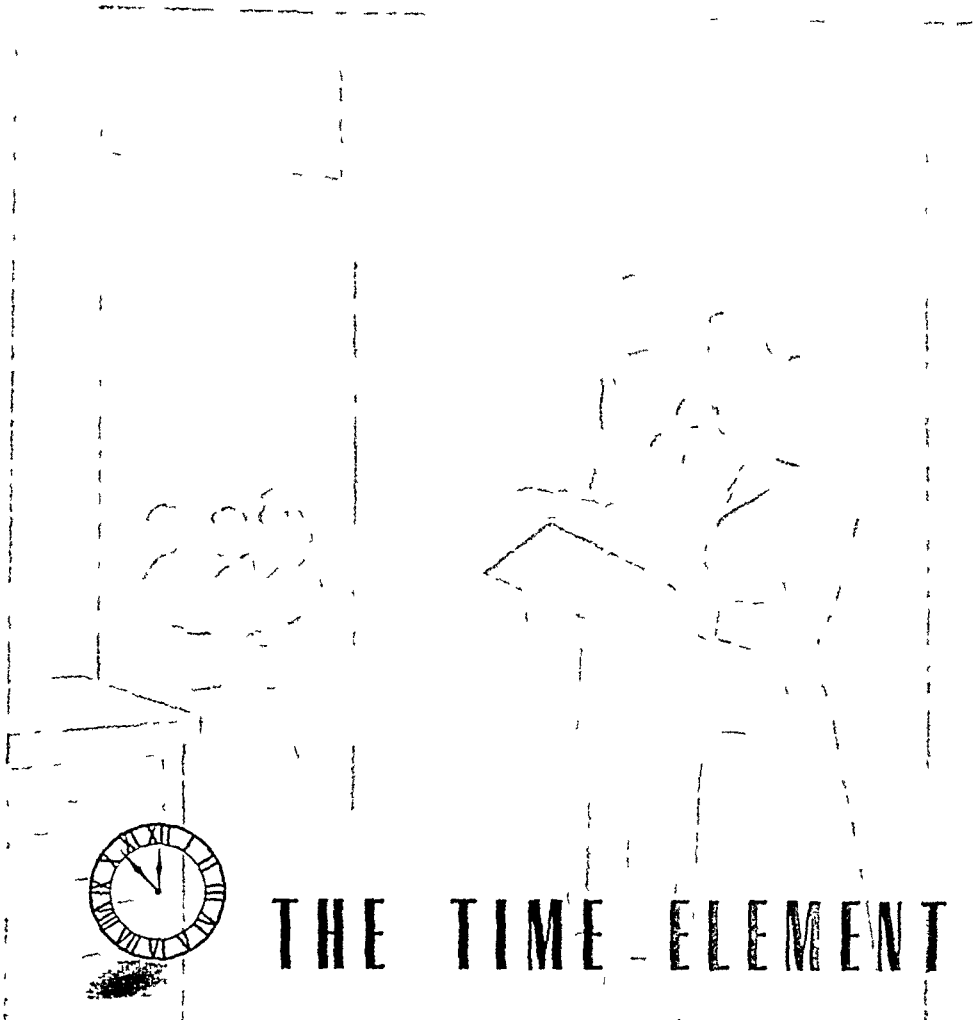

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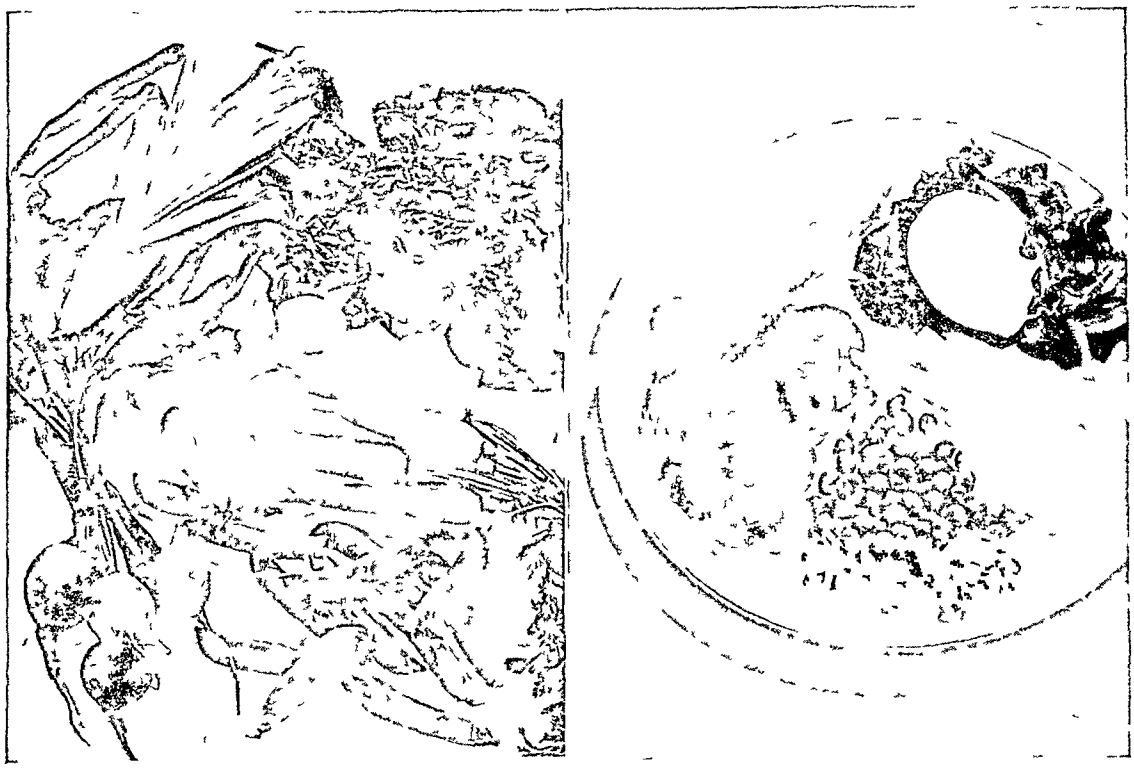

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• • •

Each fluidounce of Elixir 'B G Phos' contains

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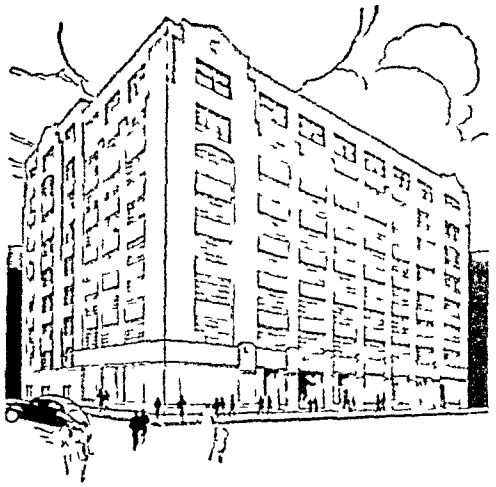

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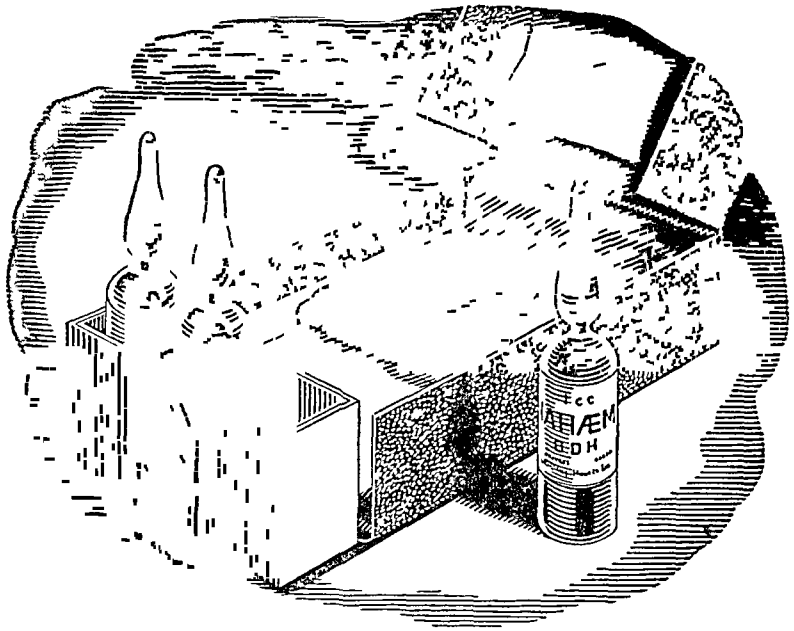

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Prepared for the interest of the Canadian Medical Profession by Charles E Frosst and Co.

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Sulfamul has proved of marked value in cases where skin g

In minor superficial burns, Sulfamul or Sulfamul impregnat

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Pillsbury et al obtained a high percentage of recoveries in

Primary pyodermas (impetigo, infections eczematoid de lesions), 30 complete recoveries out of 35 cases, in four or five d

Chronic eczematoid and intertriginous lesions of varied eti was a partial factor, showed 15 rapid complete recoveries, 7 w 50% improvement in a total of 40 cases

In 9 cases of fairly deep ulcers, complete healing was obse

Twenty seven out of 50 pyogenic infections of pre exis recovery within one week

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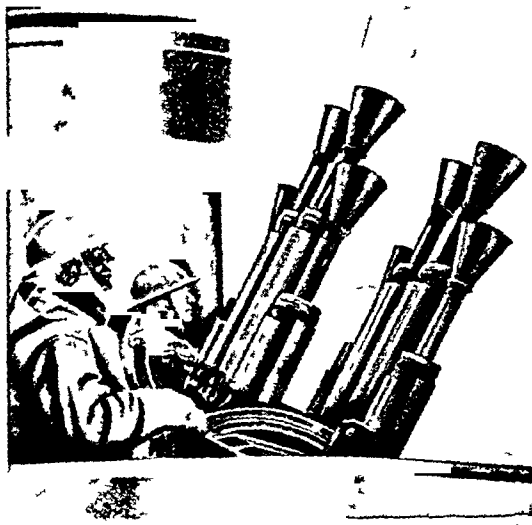

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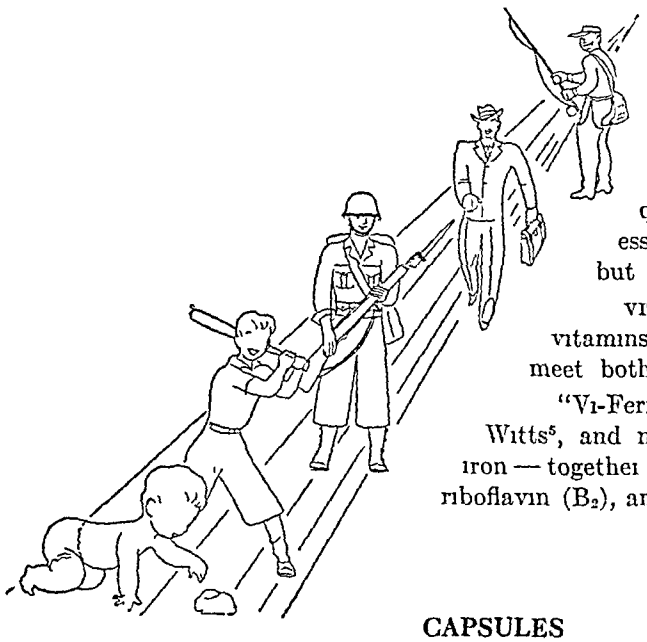

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Lederle

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40, 100 and 500 capsules

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Pantothenic Acid*	0 4 mg
Choline*	10 0 mg
Total unfractionated aqueous extract of whole liver	9 0 Gm

Together with artificial flavoring

*The need for pantothenic acid and choline in human nutrition has not been established

REFERENCES

[1]Federal Register 6 5921 (Nov 22) 1941

[2]Report on the Physiological Bases of Nutrition League of Nations 2 17 (1936)

[3]STRAUSS M B J Clin Investigation 12 345 (Mar) 1933

[4]Holt's Disease of Infancy and Childhood Appleton Century Co New York 11th edition p 618

[5]WITTS L J Proc Roy Soc Med 24 543 (Jan 13) 1931

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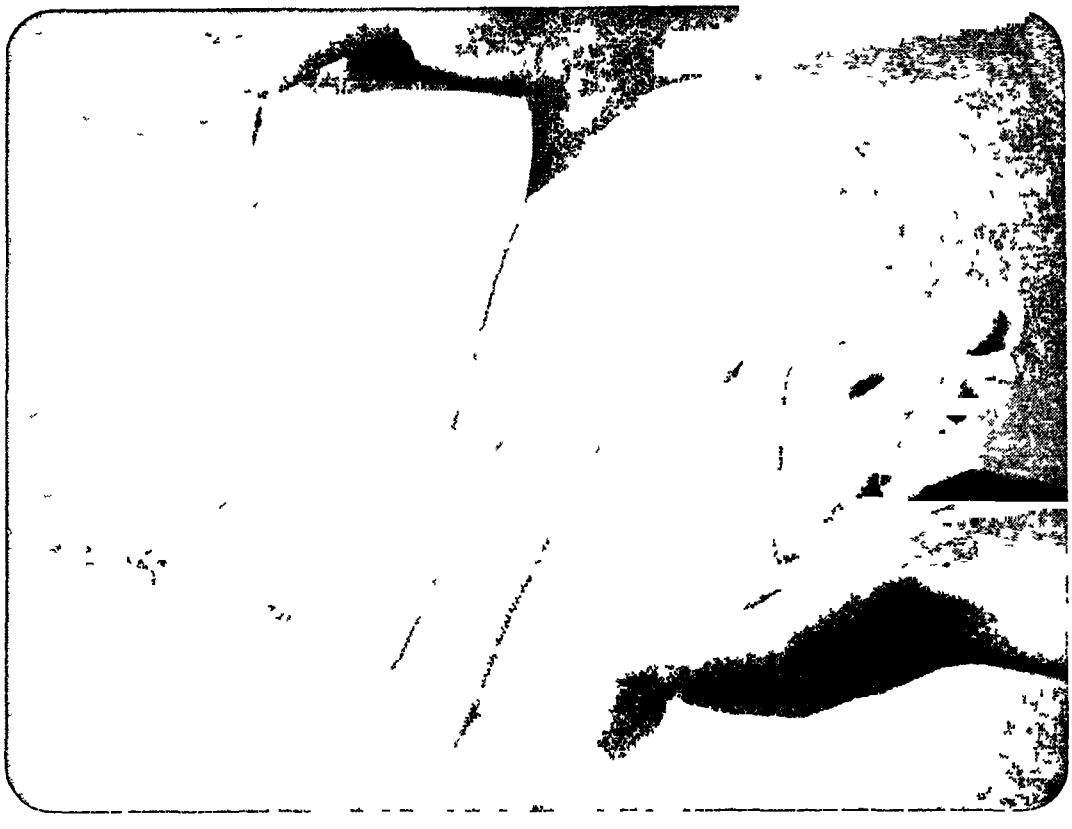

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The bandage should extend for several inches above and below the affected part, for example, in sprains of the ankle joint, it should commence at the base of the toes and finish at the upper part of the calf

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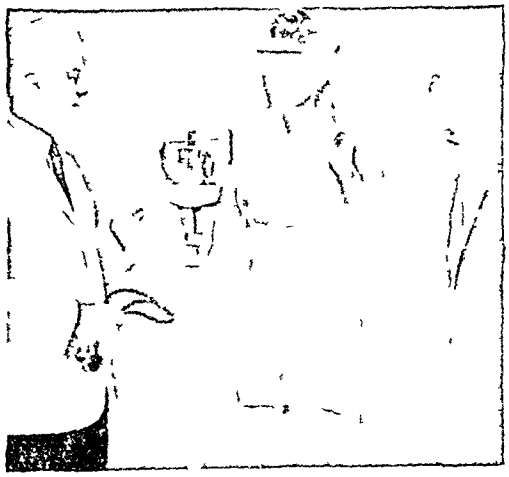

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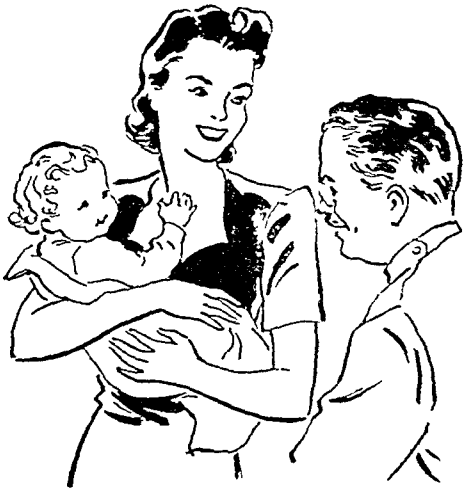
ECZEMA THERAPY
Achieved by SUPERTAH (NASON'S)



White and Grossman (*Tailby-Nason Log,* Series VIII, No 2, P 3) emphasize that the success of a tar ointment in ECZEMA depends upon *continuity* of use for ten days to three weeks or more Such continuity is hard to enforce with black tar ointment Smeared on the skin it can look more repulsive than the eczema itself It has an objectionable odor, stains clothing and linens, and may burn or irritate the skin It is hard to remove — but must be removed before re-applications

SUPERTAH (Nason's) overcomes such difficulties It is WHITE, not black, and free of obnoxious tarry odor It will not stain or discolor clothing, linen, or the skin Furthermore, SUPERTAH does not burn, irritate or cause pustulations, and need not be removed before re-applications

*Swartz & Reilly, *"Diagnosis and Treatment of Skin Diseases*, p 66

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***Survey made by independent research organization details on request*

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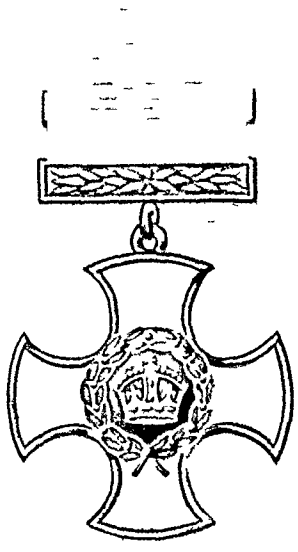

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The Ribbon is of dark red, edged with sombre blue A small silver rosette in the centre of the ribbon indicates possession of a Bar

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THE "PULHEMS" SYSTEM OF MEDICAL GRADING

By Brigadier J C Meakins

Deputy Director General of Medical Services (Canadian Army)

THE survival of any race or species has been determined by its capacity to meet the changing qualities of its environment This is equally applicable—subject to the function of time—whether it is viewed from the standpoint of terrestrial evolution or that of the tactics of war The Spartan phalanx, Hannibal's elephants, the Roman legion, Genghis Khan's cavalry, Henry III's long-bow men, Napoleon's artillery and, finally, the tank and mechanized armament Practically all of these, one way or another, have modified the physical requirements of the soldier to do the job in the best manner

In other words, the inherent qualities of function were often of more importance than anatomical perfection In all successful instances the accoutrement was designed to meet the physical and tactical requirements of the occasion There is no evidence that Hannibal's elephanteers or Genghis Khan's cavalry had a better all-round physical or anatomical development than their opponents In fact, the evidence is to the contrary The Carthaginian was not a superman as compared to the Roman, nor was the Mongol, compared to the Teutonic knight Probably both had flat feet and were of diminutive stature If particular individuals are considered it is interesting to find that many of the greatest generals had an Achilles' heel in their physical standards

The net result of these historical lessons is to emphasize the importance of not being too rigid in our general physical requirements for the fighting man but to assess his qualities in relation to the job he may do best in the present day conditions of warfare The environments of the airman at forty thousand feet altitude, the sailor forty fathoms under the sea and a soldier in a tank are as diverse as human mind can conceive, and inherently require physical, mental and emotional attributes which may be peculiar unto themselves

It is not to be taken, however, that these are necessarily more diverse than those attributes to be found in any one of the services taken by itself At the moment we are considering the Army The modern soldier may be selected to cross the sea or to fly in the air, and fight at the moment he touches terra firma In fact, he may be required to have some of the qualities of the sailor or the airman, or both In addition, his duties may require him to be an expert in hand-to-hand combat, fight in a mobile pillbox (tank), drive mechanized vehicles in the dark, be an expert in radio communication, dig tunnels of unexpected depths, bridge rivers or lakes demolish reinforced concrete with certainty and despatch In fact, there are 250 or more odd jobs, any one of which may require peculiar physical, mental and emotional abilities or disabilities, according to their specific characters It is therefore obvious that the functional assets of every soldier and his deficiencies should be known before he can be allocated to the job he can do best

When life was simpler and the army jobs were confined specifically to each arm or corps the allocation of soldiers was chiefly accomplished by personal preference, either by the soldier himself or by the officer commanding choosing whom he pleased, or by some other entirely personal equation or estimate This was but natural, as it was a survival of a past age when an individual was commissioned by the King, Emperor, or other potentate to raise a company of horse or of foot as the case might be, and is also reminiscent of the naval press gangs of a similar period

A system of differentiation slowly evolved as decade succeeded decade and wars followed wars,

and the medical point of view changed Since the period of the Napoleonic wars through the Crimean, Egyptian, South African and European wars, there has been a steady but tardy differentiation of the allocation of soldiers to a particular arm or corps This was usually based upon a gross assessment of the recruit's anatomical characteristics, coupled with a personal selection on his part motivated by imagination and peace-time occupation However, the principal point at issue was whether in the first place he was suitable to be a soldier and in which zone rather than in which arm he should serve This decision rested with the medical corps It was an unreasonable responsibility, as it depended upon anatomical findings and took little or no account of the man's physical, functional, mental or psychological qualities With the increased complexities of warfare it was imperative that all of these should be given their proper place in the final assessment for the job he might be called upon to fulfil

The traditional A1 category citizen was an Adonis of almost mythological perfection and it is an admirable compliment to the manhood of Canada that there were so many available in its hour of need, but it was equally an unjust accusation to call Canada a "C country" The anatomical physical standards required of the Canadian Army were the highest in the world and that such men were not obtainable in larger numbers is a problem to be faced by the fathers, mothers, primary school teachers, high school teachers and universities It is a matter of education in biological perfection without cant and prudish repressions Be that as it may, it was taken for granted as the duty of the Medical Corps in the first place to give an honest and specific anatomical description of each recruit and, on such, his probable capacity as a prospective soldier But it could not be within their present knowledge on such a basis to allocate each individual recruit to the job he was best fitted to do, because in addition to anatomical defects there should be a functional estimate of his physical capacity, and also of his intellectual status and emotional stability to accomplish the more or less intricate requirements of his job, and to withstand the spiritual strains and harassments of present-day warfare where every insult to the special senses, imagination, superstition and fear is used to an utterly diabolical degree

The problem facing the Medical Corps could be one of simple honesty provided it had linked with it those capable of assessing intellectual standards and emotional stability, and also those capable of unbiased allocation of the recruit to the job he can do best and with the greatest personal satisfaction The work of the last named is known as "Personnel Selection" and to this group of sincere and imaginative men the people of Canada owe a great debt because, quite apart from their present accomplishments, they are laying a basis of procedure for the future which, if the Canadian people will grasp and properly use, will reduce the probability of those frustrations and disappointments which have dogged the hopes and aspirations of each generation

At any rate, the situation in the Army was urgent and the customs of the past and the knowledge of the present had to be harnessed to meet these pressing requirements The problem stemmed from what was commonly known as "Physical Standards" These, by tradition, were based upon anatomical defects without particular regard to functional disability nor with any particular description of the degree of such It was therefore necessary to evolve a functionally descriptive picture or profile which could be readily translated into occupations, which was sufficiently medically technical, but at the same time readily usable by the Army Examiner (Personnel Selection Officer) and applicable to his duty of placing the recruit or soldier in the place where he could do his best with the greatest satisfaction to himself and the army

If one pauses for a moment to analyze our anatomical and functional assets or debts we are confronted with a rather complex problem but, on further exploration, they resolve themselves really into a simple equation It could be made most complex if we became too meticulous, but this would definitely defeat the primary purpose After considerable exploration with combinations and computations, the problem was resolved to include the most important functional requirements of a soldier These were reduced to seven and are as follows

THE SEVEN REQUIREMENTS

The physique (P) of an individual is that quality of brute force coupled with an indefinable (except by trial and error) attribute called stamina It requires that there should be

no gross visceral disease, or stigmata of such, it demands a proper ratio of height and weight as indicative of general physical development It is one of those clinical aggregations for which the medical profession has no definite yardstick On the other hand, it presents many pitfalls which are aggravated by the medical standards of life-insurance examinations which, from the army point of view, are apt to be fallacious

The following examples will be illustrative A systolic murmur is looked upon with suspicion but, when it is appreciated that such a bruit may be found in 50% of all men and oftener in women from time to time, it makes one pause to consider if it is indicative of even an anatomical defect unless supported by accessory signs such as accentuation of the second pulmonic sound (indicating increased intra-pulmonary arterial pressure) and cardiac enlargement On the other hand, a continued elevation of arterial blood pressure is indicative of future trouble, particularly in the age groups of recruits There is a fine point to be decided, whether a recruit with such a functional abnormality with its usual dynamic personality should be considered as a possible pension risk as compared with the chances of an enemy missile which he may or may not receive, and, in the meantime, be a first-class warrior It contains the essence of that balance between positive accomplishment and possible future disability

Of much greater importance are those with sub clinical chronic pulmonary lesions in which there are definitely embarrassing implications The oracular evidence of the x-ray is given too much credence while a sound physical examination and history are relegated to a secondary position This is unwarranted, particularly when it is pointed out that 10% of discharges from the army result from chronic non-tuberculous pulmonary disease

These are only given as a few of the commoner causes of dubiety in the analysis of physique and its anatomical and functional assessment It is needless to pursue this aspect further

There remains the manner by which the functional disability of any visceral lesion or constitutional abnormality may be graded This rests upon the present impediment and its probable future progression under the strain of full or modified military activity This does not require an ultimate prognosis as to life, but rather the expectancy of the immediate future and can be graded from one to five "One" is perfect "two" is modified to meet the requirements of mechanized warfare but is really the same as "one" as far as physique is concerned as stamina enters into the equation So this aspect can be continued as to other details and physiological deviations and graded as "three" for lines of communication, "four" for restricted service in Canada, and "five" as of no value to the Army

The second group to be considered is the arms and shoulder girdle (U) upon which rest manual dexterity and lifting and allied function The perfect soldier must here, as always, be the base line, but according to the possible functional disability irrespective of the anatomical lesion so it must be assessed In a mechanized army this permits of considerable latitude, for, although it may impede the use of a bayonet it may not interfere with driving a truck, or tank, or operating a wireless set or directing a 105 mm gun In fact, he may have attributes which make him superbly fitted for many jobs His functional disability is likewise graded from "one" to "five"

Thirdly, must be considered *locomotion* (*L*) This has been in the past the principal criterion for a first-class soldier, which is exemplified by the primary requirement in past standards that a recruit must be able to march so many miles walk so many miles, or be out This was an arbitrary and unrealistic standard without consideration for the soldier's other functions It reminds one of the occasion when a famous British regiment of foot were transformed into motorized infantry, and after a year of strenuous active service they were ordered to undertake a route march There was almost a mutiny "They were damned if they would, as they hadn't walked for two years" Quite rightly! They were wonderful motorized troops knew *their job and did it magnificently*, so why walk? One might as well ask an air pilot or a commander of a destroyer to march twenty five miles with full kit Flat feet, varicose veins or what have you below the waist, are of little importance in a jeep or any other vehicle as long as it gets the infantry there and brings the enemy back This example cannot be taken in its full implication, but points a moral to adorn a tale that every soldier does not need perfect locomotion

The fourth assessment is hearing (H) This has a more restricted application The scout the radio signaller and those in certain other

jobs must have acute hearing, but there are many in whom some degree of deafness is a blessing if all else is adequate It is true a soldier must hear commands, but given superb attributes of other kinds, a soldier may be invaluable even with some difficulty in hearing The necessities of good hearing need not be laboured and the gradations are of simple assessment as to the job to be filled

The fifth qualification is vision or eyesight (E) Impairment of vision unfortunately stands as a prominent functional deficiency in the people of Canada It is, however, no greater with Canadians than with our Allies and enemies Its origin, or even, cause, is a mystery which requires fundamental investigation The fact remains, however, that it exerts a downgrading for the front-line soldier second to none There is a certain consolation in the fact that as yet no one can be blamed for a condition of affairs which is beyond human knowledge, but its presence does not prevent most soldiers who are sufficiently motivated from doing a first-class job even with glasses to correct their visual impairment

The sixth qualification deals with the mental (M) status of the soldier This determination has been considered by many as an occult procedure of mystical nature In reality it is a simple and straightforward test of the individual's inherent intelligence and acquired knowledge It is true that in exceptional cases the result may seem to be askew or against the expected rule But these exceptions should not be used against the 999 which run true to form The time will shortly come when all unusual or exceptional educational backgrounds will have their proper place in this assessment It must be appreciated that a new corps has to be developed *de novo* against time to fulfill this most important and fundamental task The future implications in industry are beyond our present conception if it only be carried to a logical finality for the youth of this country There are, as will be seen in the official standards, only four grades for M

The seventh letter (S) is emotional stability, closely allied to mental attributes This, for the warrior, is his backlog of security without which all his physical and mental excellencies are of no avail In fact, the hard road of experience now shows that whereas physical defects account for 45% of rejections, miscellaneous defects 10%, psychiatric, nervous and mental practically equal the physical This may seem to some the result of immature enthusiasm on the part of the young but sincere psychologists and psychiatrists, but it is substantiated by the fact that 40% of discharges of soldiers in training on medical grounds are due to neuro-psychiatric conditions and 35% of battle casualties are due to the same grounds The causes for this state of affairs are probably many This is not the place to discuss them, but it behooves the medical profession to consider them seriously and to place Mental Hygiene in its proper place beside what may be called hygiene of physical environment in the full concept of public health

The physical standards for all of these functions can be outlined in a profile which is more or less complete in detail in degree of function if not in anatomical diagnoses To give a concrete form or formula the letters are arranged to give a new code word easy to remember, also having a veiled significance, so in school-boy language they spell "PULHEMS" There is also added the year of birth In order to signify that the soldier suffers from a remediable disability, the letter R is inserted after the number of the grade assigned It is most commonly indicated under P, U and L.

The following profiles are given as examples

TABLE I

INTERPRETATION OF SAMPLE PULHEMS PROFILES

1

YOB	P	U	L	H	E	M	S
18	1	1	1	1	1	1	1

The perfect soldier (Pulhems 5 Table II)

2

YOB	P	U	L	H	E	M	S
06	1	1	1	2	2	1	1

Slight defects in hearing and eyesight. (Pulhems 6 Table II)

3

YOB	P	U	L	H	E	M	S
00	2	2	3	3	3	1	3

Slightly impaired physical capacity slightly stiff left elbow mild varicose veins hearing not less than 10 ft. conversational voice C V other ear C V 5 ft. vision not less than 20/200 in both eyes corrected to 20/40 in both eyes good mentality some history of emotional instability in early life with good adult adjustment. (Pulhems 3 Table II)

4

YOB	P	U	L	H	E	M	S
04	1	1	1	1	2	2	1

Slightly impaired eyesight. Must have 20/120 right eye and 20/200 left eye correctible to 20/40 both eyes Intelligence sufficient for non-specialist combatant duties or trades requiring experience rather than ability (Pulhems 4, Table II)

5

YOB	P	U	L	H	E	M	S
05	2	2	2	2	2	1	1

Slightly impaired physical capacity slight defect arm or shoulder mild varicose veins feet slightly flat, hearing almost perfect, slightly impaired eyesight, 20/120 right eye and 20/200 left eye correctible to 20/40 both eyes (Pulhems 2 Table II)

6

YOB	P	U	L	H	E	M	S
99	2	2	2	3	3	2	1

Slightly impaired physical capacity arm movement restricted mildly flat feet, completely deaf in one ear but hears spoken voice at 15 ft. with other or CV 10 ft. one ear and 5 ft. other Dependent on glasses but must have 20/200 or better in both eyes correctible to 20/40 both eyes Intelligence sufficient for non-specialist combatant duties (Pulhems 7, Table II)

7

YOB	P	U	L	H	E	M	S
94	4	4	4	3	3	1	3

Specific diseases of internal organs ulcers etc. or certain surgical conditions serious interferences with joints spine, etc. which necessitate keeping man in Canada more deaf in one ear than the other CV 10 ft. one ear 5 ft. in other Dependent on glasses 20/200 in both correctible to 20/40 History of emotional instability in early years with good adult adjustment. (Pulhems 1 Table II)

TABLE II

SAMPLE PULHEMS PROFILES AND CORRESPONDING TRADES

1

YOB	P	U	L	H	E	M	S
94	4	4	4	3	3	1	3

Accountant R.C.C.S (H.W.E.) Dental Technician C.D.C. (H.W.E.) Radiographer Med R.C.A.M.C (H.W.E.) (Pulhems 7 Table I)

2

YOB	P	U	L	H	E	M	S
00	2	2	2	2	2	1	1

Ammunition Examiner R.C.O.C (Operational or L. of C.) Artificer R.C.A. (Oper or L. of C.) Boilermaker R.C.E. (L. of C or Base) Clerk All Arms (Oper.) Despatch Rider R.C.C.S (Oper./L. of C.) Draughtsman Mech R.C.E (Oper.) Driver Operator R.C.C.S R.C.E (Oper.) Hygiene and Sanitary Asst. R.C.A.M.C (Oper.) (Pulhems 5 Table I)

3

YOB	P	U	L	H	E	M	S
00	2	2	3	3	3	1	3

Armament Artificer A.A. or A.F.V. R.C.O.C (L. of C. or Base) Driver Mech R.C.A. R.C.A.S.C. R.C.C.S or R.C.E (Base) Masseur R.C.A.M.C (Base) Fitter Tractor C.F.C (Base) (Pulhems 3 Table I)

4

YOB	P	U	L	H	E	M	S
04	1	1	1	1	2	2	1

Blacksmith R.C.E (Oper.) Bricklayer Inf. of R.C.E (Oper.) Carpenter Inf. or R.C.E (Oper.) Waterman Boatman R.C.A.S.C. or R.C.E (Oper.) (Pulhems 4 Table I)

5

YOB	P	U	L	H	E	M	S
18	1	1	1	1	1	1	1

Driver Operator Inf (Motor) or R.C.A. (Oper.) Driver Mech Tanks C.A.C. (Oper.) Gunner Operator C.A.C (Oper.) Operator C.A.C (Oper.) (Pulhems 1 Table I)

6

YOB	P	U	L	H	F	M	S
06	1	1	1	2	2	1	1

Electrician R.C.E (Oper.) Engine Artificer C.F.C. or R.C.E (Oper.) Lineman R.C.S. (Oper.) Surveyor R.C.E. (Oper.) (Pulhems 2 Table I)

YOB	P	U	L	H	E	M	S
99	2	2	2	3	3	2	1

Blacksmith C.F.C. R.C.A.S.C. or R.C.O.C. (Op.) Coach Painter R.C.E. (Op.) Engine Hand R.C.A. (Op.) Painter and Decorator R.C.A.M.C. (Op.) (Pulhems 6 Table I)

In the older methods of awarding categories, it was practically the responsibility of the Medical Officer to allocate the recruit or soldier to the zone where he could serve, that is, front line, lines of communication, base or in Home War Establishment in Canada. There were general instructions as to what jobs fell into these zones, but there was no machinery whereby the soldier could be allocated to the job where his physical, mental and emotional attributes, his past training and aptitudes could serve the best purpose. A round peg in a square hole leads to frustration, lowered morale and inefficiency. In order to rectify this, there was created the Directorate of Personnel Selection.

In order that a proper concept of the duties of this Directorate may be visualized it would be well to outline the duties required. It must be appreciated that the present day army is a highly specialized organization and wars today are won by skill, endurance and intelligence rather than brute force. Every attribute of every soldier must be used to the greatest advantage to the whole fabric of the army. Therefore, the recruit must be most carefully scrutinized and allocated to the job he can most likely do best to his own satisfaction, and that of the army as a whole. As the army is a new enterprise or occupation to most, the requirements for each and every job must be laid down with meticulous exactness and then men chosen with these requirements to fill the positions in the best manner. But inequalities of requirements for quotas in the different corps and the multitudinous jobs in each, make this a most complicated business at first sight, for mechanical aptitude or experience are equally useful in the armoured corps mechanized infantry, mechanical transport, truck drivers, etc. A clerk is a clerk whether in the Ordnance, Quartermaster's stores or an office at Headquarters. And a cook is a cook if he is a good one, God bless him, as he is a most responsible person.

So it goes through all the trades and jobs which this vast organization called the Army contains. It is as intricate as any social group in the world and on the whole much better served by those numerous services unheralded and unsung. The present-day warfare of almost unbelievable exactness of timing and co-ordination of effort is due to brains used in the proper manner and still the endeavour is for better and better use of man-power. The satisfaction of perfection is in this instance as in others an acknowledgment of complacency, smug satisfaction and regression.

The field workers of the Directorate of Personnel Selection are known as "Army Examiners". From what source does the Directorate

draw these important expert officers? It could be argued that they should come from that group of experienced soldiers whom we all admire because they know the common soldier and his duties No contention could be more fallacious The army of 1940 has little resemblance to that of 1918 in technical matters, and further, the objective is to place the recruit with certain attributes, physical, mental and emotional, in the job he can do best and the physical is the most obvious and, in most ways, the easiest handled The officers of the Directorate of Personnel Selection should be on an equally high professional level as are those of the Medical Corps

The professional qualifications of the officers of the Directorate of Personnel Selection are most exacting These men should have a thorough background of psychology, a proper conception of technical educational trends and, as far as possible, knowledge of army requirements Such attributes almost indicate a super-man but, in spite of this, it can and has been done in a remarkably short time, but this was only possible by maintaining a high professional standard

In order that the "Pulhems" profiles might be applicable, the requirements for every job in the Army had to be analyzed and re oriented into fewer aggregations This has been possible until now they are reduced to about 25 general groups with minor sub groups

The translation of the "Pulhems" profiles into the language of the Army Examiner requires that each of the jobs should have a minimum profile allocated to it, in other words, the soldier must possess at least these requirements if he is to be able to do the work and satisfy his own ego and his commanding officer's desires It must be appreciated, however, that although certain soldiers may be doing a job for which they are well fitted, this does not mean that they might not be transferred, if necessary, to any analogous job in another corps, if the requirements of corps quotas made this advisable There must be a fluidity of purpose within certain limits or else there will be a wastage of skilled manpower which would be extravagance

Therefore, it is quite apparent that the Army Examiner, whether in the original allocation or in re-allocation of a misfit or the requirements of quotas, has a very exacting duty and responsibility In order that the medical and technical branches of soldiers' allocation may be linked into a functional whole, the profiles drawn above will now be placed in the jobs which they would be considered capable of doing with satisfaction to themselves and their superiors

This is the philosophy and practice of the medical functional grading or "Pulhems" and where it links into the equally important task of technical and psychological allocation of recruits and trained soldiers Between these groups there is an important distinction The recruit is a potential asset without investments, while the trained soldier is a very definite asset which cannot be lightly thrown away If he has not made good in one job, most careful consideration must be given to the possibility that he may be usefully used in another, and so the investment will not be written to loss but hopefully to profit

It would seem, therefore, that the Army Examiner, to do his duty efficiently, must receive from the Medical Corps a true physical, mental and emotional profile of the raw product which the army must weld into an efficient warrior This cannot be a snap judgment on the part of the Army Examiner, but based upon scientific and professional judgment Mere administrative allocation of "bodies" with a superficial assessment of past performances is quite unsound and productive of much confusion in allocation

It is hoped that this brief survey will illustrate what is necessary to place both medical examination and personnel selection upon a proper professional basis and alliance to give to the army the best value possible for all its manpower

A STANDARDIZED METHOD FOR PRODUCING SHOCK IN DOGS BY BLEEDING

By R A Cleghorn, M D , D Sc (Aberd),
J B Armstrong, M D and
A D McKelvey, M D

Toronto

THIS work was undertaken in order to develop a method of producing shock of approximately equal severity in dogs so that the influence of different environmental temperatures on the survival of shocked animals could be studied Bleeding was chosen as the method most likely to lend itself to controlled study In preliminary experiments in which dogs were bled slowly over an hour or more a great variation in the capacity to withstand blood loss was found It was not possible to produce a uniformly severe degree of shock in a group of animals in this way so the method was abandoned The degree of reduction in blood pressure following bleeding is experimentally a rough measure of the decrease in blood flow This has been shown by Freeman *et al*[1] to be a critical factor in the production of shock In view of this a series of dogs was bled rapidly to approximately 70 mm Hg and the pressure maintained below this level by further bleeding as necessary for 75 minutes In animals so bled it was possible by combining observations on the blood pressure and heart rate to select dogs in which shock of approximately equal severity had been produced by bleeding For the purpose of this paper these animals are referred to as a "critically bled" group

It is the object of this paper to describe the details of this technique and the criteria elaborated by which the probability of survival could be fairly accurately assessed The relative importance of different factors determining the survival of dogs following severe blood loss is also brought out by the data to be reported

METHODS

Dogs of both sexes and various breeds, weighing 4 to 30 ½ lbs, were used after several days of observation in order that the unfit or infected might be rejected They were kept in a room where the temperature varied from 60 to 70° F

Anesthetic —The evanescent barbiturate pentothal sodium, (Abbott Company) was used A single dose of 20 to 40 mgm per kilogram, injected intravenously as a 3% solution produced a surgical degree of anesthesia lasting 15 to 30 minutes

Blood volume —Plasma volume was determined two days before the bleeding experiment by the blue dye T 1824, and the blood volume calculated from the plasma volume and hematocrit The concentration of the dye was determined by a standard technique as previously described[2]

Packed volume red blood cells—Estimations were done in duplicate on heparinized blood centrifuged at 7,000 revolutions per minute for at least thirty minutes No calculation was made for plasma trapped between the red cells

Arterial blood pressure was measured during the bleeding period only It was obtained directly from a femoral artery using the special cannula citrate manometer system designed by Dr W F Greenwood, illustrated in Fig 1

Bleeding was carried out from an arm of the femoral cannula and controlled by a screw clamp Other arms on the cannula were provided for delivery of citrate to the cannula and the cleaning out of clots Blood was collected in a graduated cylinder and in reckoning the amount removed, consideration was given to the amount of citrate added (Fig 1)

Conditions of bleeding experiments—Food but not water, was withheld for sixteen hours before the bleeding which was done in a room where the temperature was 72 F After induction, anesthesia and cannulation and other preparation for bleeding took 10 minutes Animals were then bled rapidly bringing the pressure to approximately 70 mm Hg within 15 minutes of the start of the bleeding Whenever the pressure rose above this level in the ensuing 75 minutes small amounts of blood were removed to lower the pressure again In consequence of the hypotension superimposed before the effect of the initial dose of pentothal wore off rendering supplementary doses unnecessary

In dogs in which the initial blood pressure was above 120 mm Hg it was found necessary to bleed to more than 70 mm Hg to prevent a delayed fall in pressure and death as apt to occur without further bleeding For this reason a rough rule was established that when the initial pressure was high animals were bled to lower the blood pressure to a point 50 mm Hg above 70 mm Hg for every 10 mm Hg initial pressure exceed 120 mm Hg

At the end of the bleeding period the femoral artery was ligated and the dog returned to the cage In those animals dying within one or two hours after the bleeding period consciousness did not return In those surviving longer but less than 24 hours it returned at variable periods and often the animals were able to stand a couple hours after bleeding though succumbing a short time later Twenty four hours was taken as the dividing line between deaths and survivors Food and water given to those alive at the end of twenty four hours resulted in rapid improvement and recovery

The following terms have been used for the sake of brevity throughout the paper

Initial Heart Rate—the rate at the commencement of bleeding

Primary Cardiac Acceleration—that phase of tachycardia associated with the initial rapid bleeding

Maximal Primary Heart Rate—the highest rate occurring during the phase of primary cardiac acceleration

Final Heart Rate—the rate at the end of the bleeding period

Initial and Final Blood Pressures—the blood pressure levels observed at the start and end of the bleeding period

RESULTS

The amount of blood removed—In the 65 dogs studied the blood removed averaged 3 7% of the body weight On the basis of blood volume the blood loss averaged 43% for the 60

* Aided by a grant from the National Research Council Canada

From the Department of Medicine, University of Toronto

dogs in which the estimation was made Thirty-six, or 55%, of the dogs died In these the blood loss averaged 3 6% of the body weight compared with 3 7% in the 29 survivors There were very great individual differences in the amount of blood removed in different animals (Tables I and II) and it was not necessarily those having the most blood withdrawn which died There were similarly large differences in the blood volume of different animals, but no relationship between the size of blood volume and survival or death

Blood pressure changes—During the initial rapid bleeding the pressure fell slowly in most animals until 25 to 40% of the blood volume had been withdrawn, then it fell precipitously (Figs 2 and 3) Dogs with an initial pressure of 120 mm Hg and lower often showed a steady decline of blood pressure from the outset of bleeding (Fig 4) Following cessation of the initial bleeding the pressure sometimes remained at a fairly constant level below 70 mm Hg for the remainder of the bleeding period In others it continued to fall, but usually it rose gradually to and often beyond 70 mm Hg (Figs 2 and 3) Then the removal of a few cubic centimetres of blood sufficed to lower it again (Figs 3 and 4) A progressive fall occasionally developed after the second or subsequent bleeding, consequently, the final blood pressure varied considerably in different animals

A rough relationship was apparent between

TABLE I

EFFECT OF RAPID BLEEDING AND SUSTAINED HYPOTENSION IN DOGS DYING WITHIN 24 HOURS OF BLEEDING

Dog No	Blood volume c c /kgm	Amount bled		Blood pressure			Heart rate			Survival hours
		Blood volume %	Body weight %	Initial mm Hg	Final mm Hg	Final/Initial %	Initial	Maximal primary	Final	
Group A										
1	76	29	2 3	145	32	23	150	230	140	4 0
2	104	46	4 8	140	37	26	150	180	176	2 0
3	106	42	4 4	130	34	26	120	240	167	1 5
4	85	38	3 2	130	35	27	120	160	200+	3 0
5	79	48	3 8	125	35	28	160	210	240+	3 5
6	61	37	2 3	145	41	28	144	144*	160	1 0
7	68	27	1 9	130	38	29	140	140*	110	3 5
8	83	56	4 9	160	52	30	168	210	176	1 0
9	78	55	4 4	135	40	30	130	212	180	1 0
10	91	40	3 7	144	44	31	132	208	136	6 0
11	91	34	3 1	132	42	32	165	180	132	2 0
12	84	57	4 7	135	42	31	150	212	210+	0 5
13	101	31	3 1	155	50	32	180	240	166	15 0
14	64	44	2 9	155	51	33	168	190	146	8 0
15	78	35	2 8	117	40	34	120	192	162	5 5
16	66	55	3 7	153	52	34	144	190	128	6 0
17	110	53	5 8	134	46	34	80		200+	0 25
18			5 1	130	44	34	132	186	194+	1 0
19	92	24	2 2	108	38	35	150	150*	180	9 0
20	103	36	3 7	155	56	36	180	196	192+	6 0
21	86	36	3 1	150	56	37	210	240	180	18 0
22	76	25	2 0	155	60	38	150	150*	88	15 0
23	70	54	3 8	130	50	38	180	180	210+	3 5
24	101	37	3 8	125	48	38	150	180	150	1 25
Average	85	41	3 6	138	44	31	149	192	168	4 8
Group B										
25			3 0	165	64	39	186	226	192+	11 0
26	94	25	2 3	106	43	40	133	140*	120	3 0
27	95	49	4 7	140	58	42	160	210	220+	4 0
28			3 5	112	51	46	138	162	116	10 0
29	98	41	4 1	150	70	46	180	210	200+	1 5
30	83	49	4 2	130	60	46			120	10 0
31	85	33	2 3	122	58	47		148*	156	14 0
32	86	57	4 7	147	70	47		240	210+	5 0
33	79	52	4 2	153	74	48	162	210	180	1 0
34	71	53	4 1	127	63	49	132	240	162	5 0
35	103	38	4 0	122	65	53	150	156*	148	3 0
36	69	50	3 8	122	64	54	144	216	196+	3 5
Average	86	45	3 7	133	62	46	154	205	160	5 8

*Dogs having primary cardiac acceleration of less than 10 with maximal primary heart rate less than 160/min (Class II, Table III)

+Dogs having an excessively fast final heart rate, *i e*, more than 190 (Class III, Table III)

the level of the final blood pressure and death or survival, as dogs with the lowest pressures at this time generally died and those with the highest survived As Tables I and II show, the absolute level of the final blood pressure in mm Hg often failed to indicate the seriousness of the animals *condition* This is so because the initial pressure varied widely and those with a low initial pressure lived despite a final pressure level which was fatal for dogs with a higher initial pressure It seemed then that the relative decrease in blood pressure by the end of the bleeding period might be a better indication of the final outcome than the absolute level of the final blood pressure

In order to gain a ready estimation of the relative decrease in pressure at the end of the bleeding period and in order to facilitate comparison of the pressure changes in different animals the final blood pressure was calculated as a percentage of the initial pressure This has been included in Tables I and II It was found that the correlation between the final blood pressure expressed in this way and the outcome was good for when the experiments were plotted on this basis they fell naturally into three groups Those with a final blood pressure less than 39% of the initial hereafter called Group A, almost all died Those with a final blood pressure of 39 to 56%, hereafter called Group B, showed a mortality of 40% All those with a final blood pressure above 56% of the initial, hereafter called Group C, survived These results are shown graphically in Fig 4 The analysis of the experiments on the basis of the final blood pressure expressed as a percentage of the initial, thus provided the primary criterion for estimating the probability of survival

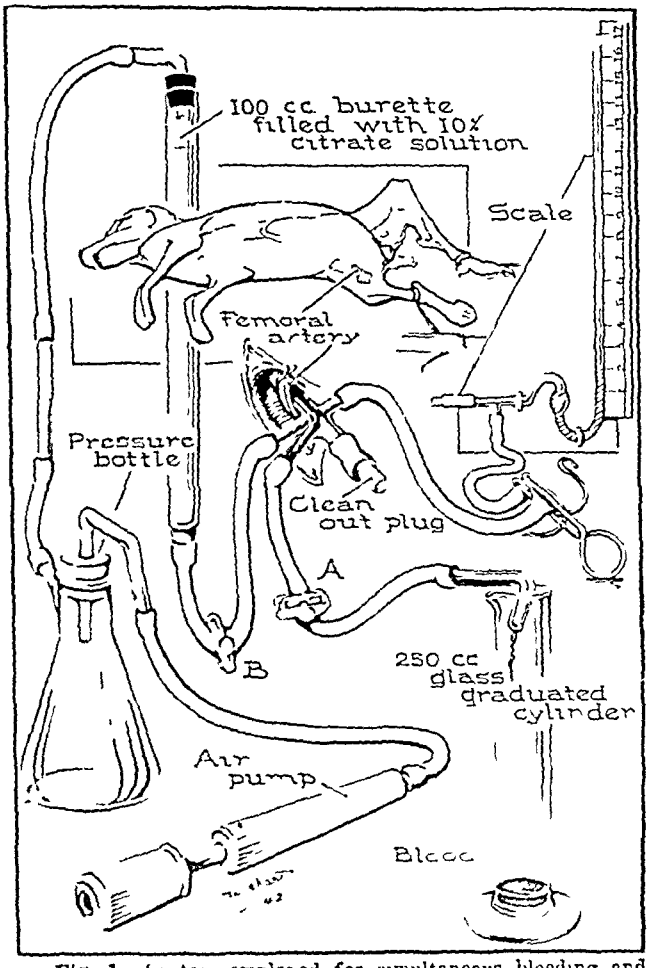

Fig 1—System employed for simultaneous bleeding and recording of blood pressure from a femoral artery

Heart rate changes—Just before bleeding was started the heart rate was almost always more than 120 per minute This was an effect of the pentothal, for non anæsthetized dogs have resting rates between 60 and 80 Characteristically, a marked acceleration of the heart rate occurred in response to the initial rapid bleeding (primary cardiac acceleration, Figs 2 and 3) Then as the blood pressure dropped, towards the end of the initial rapid bleeding, the heart rate decreased sharply, to or below the initial level Subsequently the heart rate gradually increased so that at the end of the bleeding period it usually approximated the initial rate (Figs 2 and 4) In some cases the phase of primary cardiac acceleration was not well marked or was absent (Fig 4), such dogs died In others the final heart rate was excessively fast (Fig 3), such dogs also died

The high mortality of the dogs showing unusual heart rate response suggested that there might be associated differences distinguishing them from those showing the characteristic changes The data on the dogs were therefore analyzed in another way The dogs were classified according to heart rate changes during the bleeding period and the associated data were regrouped accordingly and the figures averaged (Table III) The actual heart rate levels chosen to distinguish the different classes were selected after a close survey of the data They are neces-

TABLE II

EFFECT OF RAPID BLEEDING AND SUSTAINED HYPOTENSION IN DOGS SURVIVING BLEEDING MORE THAN 24 HOURS

Dog No	Blood volume c c kgm	Amount bled		Blood pressure			Heart rate		
		Blood volume %	Body weight %	Initial mm Hg	Final mm Hg	Final/Initial %	Initial	Maximal primary	Final
Group A									
37	70	55	3 9	155	47	30	180	220	135
38	72	55	3 9	135	52	38	120	168	116
Average	71	55	3 9	145	49 5	34	150	194	125
Group B									
39	62	45	2 8	150	59	39	160	210	140
40	88	50	4 1	142	56	40	150	210	162
41	100	42	4 2	126	55	43	154	220	160
42	83	33	2 8	118	52	44	180	194	142
43	64	60	3 9	125	55	44	172	220	180
44	89	31	2 8	125	58	46	200	200	150
45	91	38	3 5	134	67	47	188	240	156
46	70	54	3 8	125	60	48	180	180	140
47			4 3	137	67	49	162	220	180
48	91	27	2 6	117	60	51	160	190	150
49	91	39	3 5	130	68	52	180	200	164
50	82	52	4 2	140	75	53	141	180	160
51	74	50	3 7	146	75	53	150	220	168
52	85	53	4 5	175	93	53	168	186	168
53	98	47	1 4	130	70	54	106	160	106
54	79	49	3 9	125	68	54	156	210	94
55			3 1	123	68	55	160	200	144
56	68	32	2 5	138	77	56	160	210	188
Average	81 3	44	3 6	133	67	49	163	200	153
Group C									
57	98	47	4 6	114*	66	57	120	144	120
58	90	42	3 4	123	75	61	144		150
59	87	36	3 5	110	70	63	150	176	146
60	74	50	3 7	115	63	61	150		120
61	94	37	3 7	110	72	65	190	210	150
62	86	34	3 1	115	77	67	144	176	120
63	83	55	4 5	112	75	67	120	150	108
64	99	36	3 8	100	70	70	132	156	132
65	86	64	5 1	115	83	72	150		180
Average	87	45	3 9	112	73	65	147	159	136

*The initial blood pressure in this group was low They probably should have been bled to less than 70 mm Hg

TABLE III

CLASSIFICATION OF DOGS ON THE BASIS OF HEART RATE CHANGES DURING THE BLEEDING PERIOD AND ANALYSIS OF ASSOCIATED DATA

	Blood volume c c kgm	Survivors	Deaths	Amount bled (average)		Blood pressure			Survival average hours
				Blood volume %	Body weight %	Initial mm Hg	Final mm Hg	Final/Initial %	
Class I Characteristic heart rate responses Primary cardiac acceleration more than 20 or maximal primal heart rate 160 or more	83	29		45	3 7	128	67	53	Indef
	82		17	43	3 7	137	48	35	5 3
Class II Inadequate primary cardiac acceleration Primary cardiac acceleration less than 10 with maximal primary heart rate less than 160	83		7	30	2 4	126	48	38	6 7
Class III Excessively fast final heart rate (more than 190)	88		12	48	4 2	139	52	37	3 3

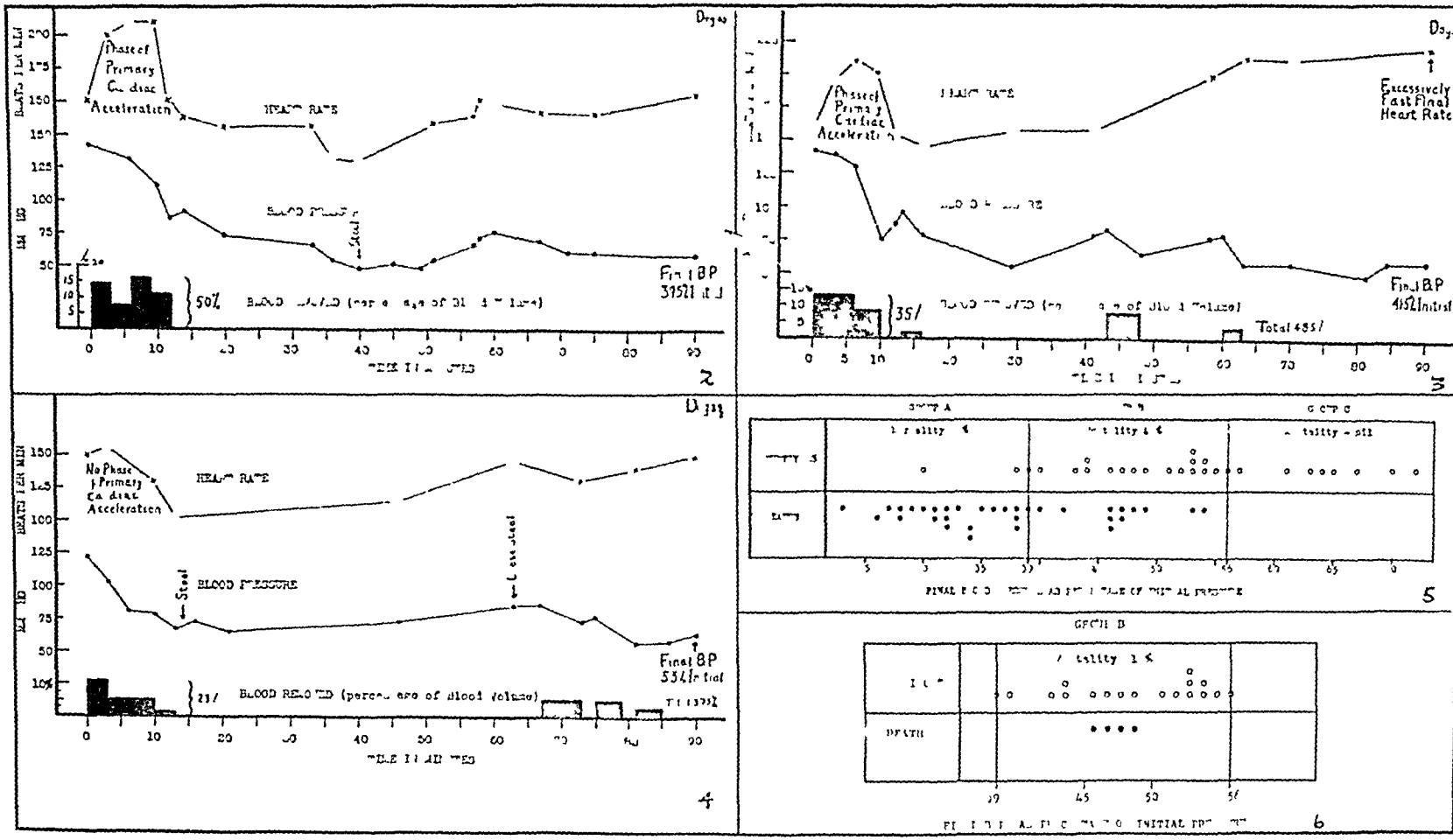

Fig 2—Blood pressure and heart rate changes following rapid severe bleeding in a dog which survived. Anesthetic in this and all other experiments a single dose of pentothal sodium 10 minutes before bleeding started. **Fig 3**—Blood pressure and heart rate changes following rapid severe bleeding and subsequent small bleedings in a dog. Death occurred 4 hours after end of bleeding period. **Fig 4**—Blood pressure and heart rate changes following rapid severe bleeding and subsequent small bleedings in a dog. Death occurred 5 hours after end of bleeding period. **Fig 5**—Distribution of deaths and survivors according to the primary criterion for estimating the probability of survival, final blood pressure as percentage of initial pressure. **Fig 6**—Distribution of deaths and survivors of Group B revised by elimination of all those in which early death could be explained on the basis of the secondary criteria, *i.e.*, excessively fast final heart rate or inadequate primary cardiac acceleration.

sarily arbitrary, but it is felt they distinguish the different groups as fairly as possible Class I consists of dogs showing the characteristic heart rate changes, a primary cardiac acceleration of more than 20 or a primary maximal rate of 160 or more This includes all of the 29 survivors and 17 of the 36 deaths Class II consists of dogs showing inadequate primary cardiac acceleration, animals showing an acceleration of less than 10 beats with a maximal primary heart rate of less than 160 Seven of the dogs that died fall in this class, but none of the survivors Class III consists of the dogs showing an excessively fast final heart rate, more than 190 Twelve of the dogs that died fall in this class, but none of the survivors

Analysis of the other data on these dogs shows, as previously noted, that the average final blood pressure level of the dogs that died was much less than that of the survivors Dogs in which primary cardiac acceleration was judged inadequate (Class II) showed a striking inability to withstand relatively slight blood loss The amount of blood removed from these was but 2 4% of the body weight or 30% of the blood volume The dogs showing an excessively fast final heart rate (Class III) had the most blood removed of any group, an average of 4 2% of the body weight, or 48% of the blood volume, they also had the largest average blood volume and the shortest survival

Since inadequate primary cardiac acceleration and an excessively fast final heart rate were always associated with a fatal outcome these characteristics have been termed secondary criteria for estimating the probability of survival

Selection of a group of critically bled dogs — The primary criterion for estimating survival, the final blood pressure expressed as a percentage of the initial pressure, divided the experiments into three groups Almost all the dogs in Group A, those having a final pressure less than 39% of the initial, died All those in Group C having a pressure more than 56% of the initial lived Only in the intermediate Group B, dogs having a final pressure of 39 to 56% of the initial, was there considerable doubt whether any individual would live or not Of the 30 dogs in this group 12 died Death could be almost certainly predicted in 8 of these 12, in virtue of the secondary criteria, namely heart rate changes Five of the 8 had excessively fast final heart rates and 3 showed inadequate primary cardiac acceleration In order to select a group in which the outcome was truly doubtful the 8 dogs showing such heart rate characteristics had to be left out All the remaining 22 dogs were critically bled and it was not possible to tell which would live and which would die, though the mortality was but 18% The distribution of these animals according to the primary criterion is shown in Fig 6

Changes in volume of packed red blood cells —These observations did not help to distinguish the dogs that lived from those that died They showed, however, that a mild degree of hæmoconcentration was present at the end of the bleeding period in all dogs bled Splenic activity associated with the recovery from the anæsthesia presumably accounted, in part at least, for this increase in cell volume, which averaged 18% Evidence of slight hæmodilution in survivors 24 hours after being bled was seen in a few cases only These dogs had not of course received water during this 24-hour period

Post-mortem findings —There was generalized pallor of the organs of dogs dying within a few minutes of the end of the bleeding period Animals dying an hour and more later showed congestion and hæmorrhages of the mucosa of the gastrointestinal tract, which was most intense in the duodenum where material like red currant jelly was found in the lumen Subserosal hæmorrhages were sometimes seen Not infrequently the pancreas was mildly congested Congestion in the adrenal gland at the junction of cortex and medulla and mild congestion and small hæmorrhages in the adrenal cortex were found frequently The cortex of the adrenal was not of a normal colour, but had a slightly grey-green cast, apparently due to the use of the blue dye T 1824 used in the blood volume determinations

DISCUSSION

Our experiments indicated that when the rate of bleeding and blood pressure level to which dogs were bled were similar, survival was dependent more on the inherent capacity of the animal to withstand blood loss than on the amount bled This capacity would seem to depend on the effective maintenance of an adequate circulation by vasomotor and other cardiovascular mechanisms The best measure of the effectiveness of these mechanisms was the relative decrease in blood pressure at the end of the bleeding period Since the initial or

starting blood pressure varied considerably in different animals, it was not possible to gain an accurate idea of the extent of the fall in pressure by a knowledge of the final blood pressure in mm Hg only, therefore the final blood pressure was expressed as a percentage of the initial It was then possible to see at a glance the proportion of the fall and to compare the changes in different experiments Such a comparison showed that the mortality varied directly with the percentage decrease in pressure, or inversely as the final blood pressure, expressed as a percentage of the initial Thus the fundamental basis or primary criterion for estimating the probability of survival was established The survivors and deaths, when plotted on the basis of the final/initial blood pressure percentage, fell into three readily recognizable groups, Group A probable deaths, Group B doubtful, and Group C probable survivors

Further aid in the selection of a critically-bled group of dogs was obtained by observations of the heart rate Animals showing either an inadequate degree of cardiac acceleration with the initial bleeding or an excessively fast final heart rate died Thus, what is termed secondary criteria for estimating the probability of survival were provided, and by applying these to the Group B dogs, as defined by the primary criterion, final selection of a critically-bled group was accomplished The application of the secondary criteria to the 30 dogs of Group B indicated 8 which would certainly die The remaining 22 constitute the critically-bled group with a mortality of 18% It was not possible to tell which of them would die

The cause for failure of the compensatory mechanism of cardiac acceleration probably lies in a defect in emergency reflex controls, an ill understood subject,[5] though it is admittedly possible that the anæsthetic may have been responsible to some extent The cause of the excessively fast final heart rate might be either a disturbance in vasomotor control or an integral disorder in cardiac metabolism dependent on a decreased coronary artery flow, for Anrep[6] has shown that such a degree of tachycardia is associated with a decreased coronary flow Tachycardia in shock in man is also of serious import according to Grant and Reeve[7] and others Cardiac output is no doubt concurrently reduced and weakening of ventricular contraction is probably associated with the terminal decline in blood pressure, an opinion also recorded by Price *et al*[8]

The bradycardia observed towards the end of the initial rapid bleeding coincided with a sharp drop in blood pressure This phenomenon has been observed in men bled large amounts experimentally by Ebert, Stead and Gibson[9] and by Wallace and Sharpey-Schafer[10] The former investigators suggest that the ischæmia resulting from blood loss stimulated parasympathetic centres either directly or reflexly Observations on dogs in adrenal insufficiency[11] suggest that the bradycardia encountered there is due to inadequate blood flow in the coronary arteries The same explanation may apply to the bradycardia with hæmorrhage where the bradycardia is probably responsible for the fall in blood pressure, rather than *vice versa*

The amount of blood loss required to kill dogs varied widely It bore little or no relation to the blood volume in our experiments or in those of Price *et al*[3] It depends to a certain extent on experimental conditions such as type of anæsthesia and rate of bleeding By bleeding slowly Blalock[4] was able to remove an amount of blood averaging 4 5% of the body weight from dogs under local anæsthesia, but only 4 2% from dogs under sodium barbital before death occurred Bleeding rapidly Price and co-workers[3] removed blood averaging 3 5% of the body weight from 32 dogs under nembutal Half the dogs died and death appeared certain in the other half when therapy was instituted

The rate of bleeding in our experiments resembles that in those of Price *et al*,[3] but not all the blood was removed with the initial rapid bleeding The total amount of blood let in our dogs was 3 7% of the body weight and thirty-six, or 55%, of the animals died Our experiments also differ in that pentothal sodium was used as the anæsthetic This barbiturate was selected because it was evanescent and hence does not impair vasomotor compensatory reactions following hæmorrhage to the same extent as longer acting anæsthetics This is of particular importance in studies on shock, since it has been shown that prolonged anæsthesia with ether or pento barbital sodium may lead to visceral changes similar to those seen in shock[4]

The pathological changes observed were similar to those described by other workers on shock[1 3 4] These findings suggest that there had been profound reduction in blood flow and capillary damage in the intestine and adrenal

cortex at least To what extent these changes contributed to the death of the animal is not known It should be pointed out that, in the splanchnic region where these changes occur, vasoconstrictor fibres are abundant and the oxygen requirement of tissues is high as contrasted with that of the skin, the other major region in which vasoconstrictor fibres predominate

SUMMARY

1 A method is described for the production of shock by bleeding, and criteria are detailed by which a critically-bled group may be selected

2 The dogs were bled rapidly from a femoral artery, so that within 15 minutes the blood pressure was reduced to about 70 mm Hg The pressure was maintained below this level by subsequent bleeding as necessary for another 75 minutes A single dose of pentothal sodium was used to obtain narcosis during cannulation and the initial bleeding

3 The amount of blood removed averaged 3 7% of the body weight for the 65 dogs bled, or 43% of the blood volume for the 60 in which this estimation had been made Thirty-six, or 55%, of the series died within 24 hours There was no close or consistent relationship between the outcome and the size of the blood volume or the amount of blood withdrawn

4 Death and survival were found to be closely correlated with the blood pressure level at the end of the bleeding period expressed as a percentage of that at the outset This was called the primary criterion for estimating the probability of survival and permitted categorization of the dogs into three groups Only in dogs having a final blood pressure of 39 to 56% of the initial pressure was the outcome in doubt Those having lower pressures died, those having higher pressures lived

5 Dogs failing to show the usual degree of cardiac acceleration with the initial rapid bleeding and dogs having a heart rate in excess of 190 at the end of the bleeding period died These heart rate characteristics have been termed secondary criteria for estimating the probability of survival

6 Several dogs belonging to the doubtful group, on the basis of the primary criterion, could be eliminated as certain to die when judged by the secondary criteria A critically-bled group remained in which the mortality was 18%, and the outcome in any case was doubtful

7 At post-mortem the abdominal viscera including the intestinal mucosa appeared pale in dogs dying shortly after the end of the bleeding period In dogs dying later congestion and hæmorrhage of the mucosa in the gastro-intestinal tract and adrenal cortex were found The adrenal cortex seemed to be stained by the blue dye T 1824

8 Factors determining the survival of dogs after hæmorrhage are discussed

9 Animals bled and selected as described are suitable for investigating the influence of environmental temperatures in shock

We are indebted to Prof Duncan Graham and Drs R F Farquharson and A. C Burton for helpful criticism Mr Walter Cowan rendered expert technical assistance which we gratefully acknowledge

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A comparison of the results of the mass radiography of 30,000 W A A F recruits with that of 30,000 men of similar ages has shown that the incidence of pulmonary tuberculosis among the former was one third as much again as among the latter, actual percentages being 0 79 and 0 58 respectively The women had regarded themselves as fit, yet 102 of them had active tuberculosis Of these 102 only 66 could be recognized as suffering from the disease by the usual physical signs, so that mass radiography detected half as many cases again as did percussion and auscultation It was decided that 4 per 1,000 of the women examined were in need of immediate institutional therapy and that about 6 per 1,000 needed re examination at intervals—*J Roy Inst Pub Health & Hygiene*, 1943, 6 227

THE EFFECT OF DIFFERENT ENVIRONMENTAL TEMPERATURES ON THE SURVIVAL OF DOGS AFTER SEVERE BLEEDING*

By R A Cleghorn, M D, D Sc (Aberd)

Toronto

IN the routine treatment for shock following trauma or hæmorrhage the application of heat to the patient has been emphasized Bazett[1] considers the use of heat wrong in principle and bad in practice in conditions such as shock in which the blood volume is seriously reduced The dilatation of skin vessels which ensues diverts blood away from more vital tissues and reduces the fluid reserves by sweating Experimental evidence which indicates that heat shortens the survival of shocked animals was first presented by Blalock and Mason,[2] more recently by Wilkins and Gatch[3]

There is little room for doubting the adverse effect of extremes of temperature on the survival of shocked animals Evidence on the influence of less severe degrees of heating, such as might be employed clinically and of moderate cooling in shock was not available Therefore, the present work was undertaken The soundest way to study the effect of different temperatures on survival in shock seemed to be by using a series of animals in which shock of a similar severity had been produced, but in which a majority might be expected to survive In the preceding paper[4] a standardized method for producing shock in dogs by bleeding was described and the criteria established by which the survival of such animals could be predicted These observations made it possible to select a group of "critically-bled dogs" which were suitable for investigating the effect of different environmental temperatures on the survival It is the purpose of the present paper to describe the results of such experiments

EXPERIMENTAL CONDITIONS

All dogs were kept, prior to the experiments, in rooms where the temperature was 60 to 70° F and during the bleeding in a room where the temperature was 72° F Environmental temperatures of 85 and 95° F were obtained by heating an insulated metabolism cage with thermostatically controlled lamps An environment of 52° F was obtained by using a large thermostatically regulated refrigerator room Bleeding experiments were carried out as described in the previous paper[4] In brief, this consisted in bleeding rapidly from a cannulated femoral artery, after a single anæsthetic dose of pentothal sodium, so that the pressure fell to approximately 70 mm Hg within 15 minutes During the following 75 minutes the blood pressure was maintained below 70 mm Hg by the removal of small amounts of blood as necessary The dogs were put in cages at the desired temperature within 10 minutes of cessation of the 90 minute bleeding period Food and water were withheld for 24 hours and then given to survivors Those animals living 24 hours were no longer dangerous by all and when given water drank it and made a complete recovery thereafter

RESULTS

In our previous bleeding experiments[4] it was found that there was a fairly close correlation between the blood pressure level at the end of the bleeding period, expressed as a percentage of the blood pressure at the outset, and survival Practically all those with the lowest pressures died, those with the highest lived The outcome of those in the intermediate range, having a blood pressure at the end of the bleeding period from 39 to 56% of the blood pressure at the outset, was doubtful It was found that in some of these a heart rate of more than 190 at the end of the bleeding period occurred and in others the usual degree of tachycardia with the initial rapid bleeding was not seen These characteristics were invariably associated with a fatal outcome Therefore such animals are eliminated from the group Those remaining constituted the group of "critically bled dogs" in which the outcome was truly doubtful By these methods of selection a group of animals suitable for testing the effects of different environmental temperatures was obtained

1 *Mortality of dogs kept at different environmental temperatures after bleeding*

72° F—This group consisted of 22 dogs 4 of which died in less than 24 hours This is a mortality of 18%

52° F—This group consisted of 21 dogs, 8 of which died in less than 24 hours This is a mortality of 38%

85° F—This group consisted of 11 dogs 5 of which died in less than 24 hours This is a mortality of 45%

95° F—This group consisted of 14 dogs 13 of which died in less than 24 hours This is a mortality of 93%

The results are indicated graphically in Fig 1 Panting was an outstanding symptom in the 95° F group It was not apparent in animals kept at lower temperatures Panting is associated with an increased water loss in the expired air, this being the manner in which dogs increase the dissipation of heat It was suspected that the increased water loss associated with panting accounted to a large extent for the

* Aided by a grant from the National Research Council, Canada

From the Department of Medicine, University of Toronto

high mortality This hypothesis was supported by estimations of the insensible water loss and by experiments in which water was given to another group of dogs exposed to 95° F after bleeding

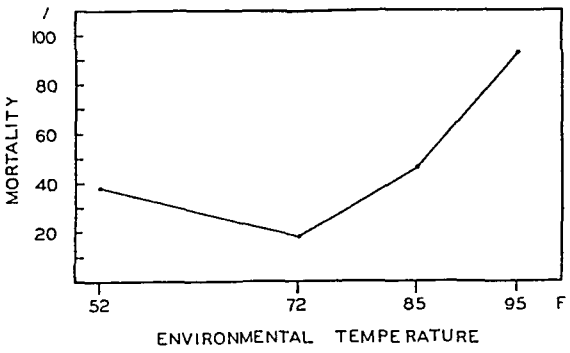

Fig 1—Influence of different environmental temperatures on the mortality of dogs following severe bleeding

2 *Insensible water loss of dogs at different environmental temperatures after bleeding* — This was estimated in the majority of experiments It was done by weighing the dogs at the end of the bleeding period and again at death, or at the end of 24 hours in the case of survivors Urine was collected and weighed and this figure deducted from the observed weight loss The net weight loss was divided by the product of the dog's weight and duration of survival in hours In the case of survivors this was 24 hours The resultant figure expresses the insensible water loss as cubic centimetres per kilogram per hour The findings are summarized in Table I, where it is shown that at 52° F the insensible water loss is less than half that at 72 or 85° F The difference between the average water loss at 72 and 85° is not held to be significant The great increase in water loss in dogs exposed to 95° F temperature should be noted It is practically double that of the animals maintained at 72 or 85° F

TABLE I

INSENSIBLE WATER LOSS* IN DOGS EXPOSED TO ENVIRONMENTS OF DIFFERENT TEMPERATURE AFTER SEVERE BLEEDING

Temperature degrees F	*Number of dogs studied*	*Insensible water loss*	
		Range c c kgm	*Average c c kgm*
52	16	0 17 - 2 4	0 9
72	12	0 7 - 3 7	2 3
85	8	1 2 - 2 9	2 0
95	12	1 5 - 6 0	4 0

* The insensible water loss of dogs under basal conditions at room temperature was found to be 0 6 c c per kilogram per hour by Price *et al* [5]

3 *Mortality of dogs kept at 95° F and given water after bleeding* —This group consisted of 7 dogs Two to three hours after being put into the cage at 95° F they were sufficiently alert to lap water unassisted Twelve c c per kilogram was then allowed Five hours later 30 c c per kilogram was given to the 6 still living The total amount of water given approximately equals the increase in the insensible water loss which occurs in dogs at 95° as opposed to those at lower temperatures Three of the dogs died in less than 24 hours, a mortality of 43% The insensible water loss in this group of dogs averaged 3 9 c c per kilogram per hour

4 *Rectal temperature of dogs exposed to different environmental temperatures* —In Table II are summarized the observations made The dogs in an environment of 52° F had an average rectal temperature 1 5° F less than that in the 72° F group Those exposed to an environment of 85° F showed an average elevation of 1 1° F compared to the 72° F group The dogs kept at 95° F showed an elevation averaging 2 9° F greater than those at 72° F

TABLE II

EFFECT OF DIFFERENT ENVIRONMENTAL TEMPERATURES ON THE RECTAL TEMPERATURE OF DOGS AFTER SEVERE BLEEDING

Environmental temperature Degrees F	*Dogs examined No*	*Rectal temperature*	
		Range Degrees F	*Average Degrees F*
52	12	97 5 - 102 8	101 0
72	30	98 5 - 106 0	102 5
85	3	102 5 - 104 7	103 6
95	7	102 5 - 106 9	105 4

5 *Other data on dogs exposed to different environmental temperatures after bleeding* —In Table III are summarized data on the mortality, amount bled, final blood pressure and duration of survival of the dogs bled These data show that there is no consistent relationship between the amount of blood removed and survival or between the average "final" blood pressure, *i e*, at the end of the bleeding period, expressed as a percentage of the blood pressure at the outset, called "initial" In no case was this pressure less than 39% and in no case more than 56% expressed as final/initial blood pressure The final averages are within a narrow range The duration of survival of the dogs that died in less

TABLE III

COMPARISON OF DATA ON DOGS EXPOSED TO DIFFERENT ENVIRONMENTAL TEMPERATURES FOLLOWING SEVERE BLEEDING

Experiment Environmental temperature Fahrenheit	Result	Dogs No	Mortality %	Average amount bled		Blood pressure	Duration survival of dogs dying
				Blood volume %	Body weight %	Final/Initial Average %	Average hours
72°	Survived	18	18 0	44 0	3 6	49 0	5 7
	Died	1		51 0 (3)*	4 0	47 0	
52°	Survived	13	38 0	45 0 (7)*	4 0	46 0	
	Died	8		48 0 (2)*	3 9	45 0	9 0
85°	Survived	6	45 0	45 0	4 2	46 0	
	Died	5		42 0	3 7	48 0	11 6
95°	Survived	1	93 0	44 0	3 5	56 0	8 4
	Died	13		44 0	3 8	50 0	
95°–H_2O	Survived	1	43 0	16 0	3 9	45 0	8 0
	Died	3		51 0	3 9	48 0	

* In these cases blood volumes obtained only on number of dogs noted in brackets When blood volume estimations were not obtained for technical reasons injection of dye and blood sampling carried out as usual

than 24 hours is given as averages but no significant difference in the different groups is apparent

DISCUSSION

The mortality of dogs exposed to environmental temperatures of 52, 72, 85 and 95° F after severe bleeding was found to be lowest in the group kept at 72° F The use of a standardized technique of bleeding ensured that the different groups were bled to a similar critical degree The differences in mortality are therefore considered to be unquestionably significant It is also felt that the criterion of death or survival used here is a sound measure for determining the effect of different environmental temperatures Results based wholly on the duration of survival of animals most or all of which die at the optimal temperature, as in Wakim and Gatch's experiments,[3] are not as easy to interpret

The mild degree of cooling used in our experiments (52° F) was associated with a mortality twice that of the dogs kept at 72° F This is attributable to the heightened oxygen requirement resulting from the increased stimulus to heat production exerted by the cold Changes due to anoxia occur early in shock[6] and anything which increases the oxygen requirement or hinders the oxygen uptake will accelerate those metabolic disturbances which lead to death in this condition It should be pointed out, however, that the withholding of water for 24 hours following bleeding was less serious for the animals kept in the cool atmosphere, since their insensible water loss was much less than those kept at 72° F For a dog weighing 10 kgm it represents a saving of approximately 260 c c in the 24 hours Thus saving effect of the cool environment on water loss may counterbalance to some extent the deleterious influence exerted by this degree of cold in other ways

The results of previous workers on the influence of cold on the survival of shocked animals are contradictory In the experiments of Blalock and Mason[2] dogs packed in ice bags following hæmorrhage or trauma survived longer than controls not so treated The mortality of the cooled dogs was however not improved The rectal temperature was depressed by 10 to 22° F In our experiments in which the method and degree of cooling was less severe the rectal temperature was but 1 2° less than in the 72° F group Wakim and Gatch[3] found, in contrast to Blalock and Mason,[2] that the survival of shocked animals was shortened by the application of ice bags No effect was apparent on mortality which was practically 100% in all experiments Rectal temperatures were not recorded

The mild warming exerted by an atmosphere of 85° F in our experiments resulted in a mortality more than twice that of the 72° F group This probably represents the deleterious influence of vasodilatation, for the insensible water loss was not increased above that of the dogs kept at 72° F

The more extreme degree of warming used, namely 95° F , led to a mortality of about 100% Vasodilatation no doubt occurred in these animals as in those at 85° F and contributed in part to the increased mortality The fact that the mortality was greater at 95 than at 85° F is attributable to the diminution in the amount

of fluid available for dilution of the blood in the tissues of the former This is a direct result of the increase in the insensible water loss at the higher temperature This explanation was supported by the finding that the administration of water to another group at 95° F reduced the mortality to about that of dogs at 85° F It is of interest that Rubner (quoted by Lusk[7]) showed many years ago that water and, therefore, heat loss was doubled in dogs between 85 and 95° F

The results of Blalock and Mason[2] and Wakim and Gatch[3] on the effect of heat in shock are in the same direction as those reported in this paper They found that the direct application of an even more extreme degree of heat to shocked animals decreased the duration of survival A rise of rectal temperature of 6 to 7° F was observed by the former workers as opposed to the average elevation of 3° F found in our dogs Since alterations in environmental temperature lead to reflex as well as direct changes in the calibre of blood vessels the physiological responses of animals being investigated to determine the effect of different environmental temperatures should not be impaired by anæsthesia This is doubly important when such experiments are being made on shocked animals where the effect of a prolonged anæsthetic may aggravate the condition The evanescent barbiturate pentothal sodium was used in the present work Consequently vascular reactions were probably interfered with much less than in previous workers' animals in which barbiturates having a more prolonged effect were used

The vascular and respiratory changes in response to increases in temperature in animals and man have been discussed in detail by Bazett,[8, 9] but it should be pointed out that water loss by the lungs is infinitely more important in dogs than in man Sweating does not occur to any extent, if at all, only on the pads of dogs In man it plays a most important rôle in response to increases in environmental temperature and could be expected to account for relatively as great or greater water loss under conditions similar to those to which our dogs were exposed In man vasodilatation of skin vessels is of considerably more importance than in the dog in view of the greater vascularity of man's skin and the part changes in the blood flow in this tissue play in the conservation and dissipation of heat Full dilatation of skin vessels in man will accommodate about 500 c c of blood[9] In patients suffering a critical reduction in blood volume, as in shock and hæmorrhage, to divert so much blood from vital tissues to the skin by heat and to deplete water reserves by sweating may well lead to disaster A recent paper by Brown, Evans and Mendelssohn[10] indicates the reality of this danger They draw attention to the drop in blood pressure which they observed in patients with secondary shock following the application of heat and wisely caution against this danger

Wakim and Gatch[3] recommend that the room temperature of shocked patients be regulated to 85° F This is not justified by the data they present Blalock and Mason[2] warn against the use of excessive heat in shock Our data show that the mortality of critically-bled dogs, adapted to temperatures of 60 to 70° F , is more than doubled by exposure to an environment of 85° A temperature of 95° F is even less well tolerated, probably on account of the associated increase in the insensible water loss

Summary

1 The influence of different environmental temperatures on the survival of critically-bled dogs has been investigated

2 The mortality at four different temperatures was as follows 18% at 72° F , 38% at 52° F , 45% at 85° F , and 93% at 95° F

3 The higher mortality in the dogs at 52° compared with those at 72° F is ascribed to the increased oxygen requirement

4 The higher mortality in the dogs at 85° compared to those at 72° F is attributed to the deleterious influence of vasodilatation caused by this degree of warming The insensible water loss in this group was not a factor as it was the same at both temperatures

5 The higher mortality in the dogs at 95° compared with those at 72° F is ascribed to vasodilatation and to increase in insensible water loss associated with the panting which occurred at this temperature

6 In another group of dogs exposed to 95° F an amount of water equivalent to the increase in the insensible water loss was given The mortality in this group was reduced to approximately that seen in the dogs exposed to 85° F

7 The difference in the responses of dogs and man to elevation of the environmental temperature are briefly discussed and the reasons why patients who are suffering from secondary shock or severe acute hæmorrhage should not be heated are cited

The author wishes to express his appreciation of the support and helpful criticism of Professor Duncan Graham To Professor H C Bazett he is deeply indebted for many suggestions and the benefit of useful discussions The thermostatically regulated heat chamber was built under the supervision of *Dr A C Burton*, whose aid in this and many other ways is gratefully acknowledged Thanks are also due Messrs W Cowan and J Kirkwood who rendered invaluable help in the experiments, and to Mr S Smith who kindly built the heat chamber

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THREE YEARS OF NEUROPSYCHIATRY IN THE CANADIAN ARMY (OVERSEAS)

By Colonel F H van Nostrand, R.C.A.M.C

Consultant Neuropsychiatrist, Canadian Army (Overseas)

PART II *

RECORDS AND STATISTICS

DURING the summer of 1941, Major H T Ewart set up at the Neurological Hospital an excellent central registry, which has a cross reference card index system, kept up to date from entries in the A and D Book This is a great aid to the statistician, in that incidence of various types of disease can readily be ascertained from the card index, or, if it is desired to study a particular group in detail, all of the case histories of that group may be drawn

Records of the cases seen by the regional neuropsychiatrists are kept in a supplementary card index system in the office of the consultant neuropsychiatrist at C M H Q Therefore, either at the Neurological Hospital or at C M H Q there should be a record of every man in the C A (O) who has been examined by a neuropsychiatric specialist It is admitted that when the regional neuropsychiatrists go abroad with the C A (O), *their records* will be less complete, but in the meantime, we are assembling a mass of useful data

Valuable follow-up information is obtained from the office of A M D 2, through which all medical boards pass Information *re* ultimate disposal is obtained through Records Branch, Acton

Approximately 10% of all cases seen by regional neuropsychiatrists show evidence of organic nervous disease Most of these are referred to the Neurological Hospital for further investigation or treatment Thirty to 35% of admissions to the medical division of that hospital suffer from organic nervous disease The proportion of organic to functional cases admitted to hospital is rising, due to change in policy, not to altered incidence of disease

The commonest neurological diagnosis is neuritis Next in frequency is syphilis of the central nervous system In only one case of neurosyphilis was the disease contracted during the present war In all others the primary lesion was noted prior to September, 1939, or the date of infection is unknown Many patients had received inadequate antisyphilitic treatment in Canada Had routine blood Wassermann tests been done on enlistment, most of these cases would have been identified

A detailed statistical study is outside the scope of this survey, but will form the basis for a subsequent report Some statistics, showing the high proportion of soldiers who have been invalided with functional nervous disease will be briefly discussed, because they give rise to the disquieting feeling that it may be unwise to retain any constitutionally psychoneurotic soldier in a combat force overseas

Hyland and Richardson[5] have published an excellent report on a large series of patients admitted to the Neurological Hospital It must be remembered that their statistics are based on patients who have been admitted to a special hospital, and do not give the true picture of either the proportional incidence of the various groups of functional nervous disease in the C A (O) as a whole, or of the wastage of manpower resulting from these diseases Their series is heavily weighted with psychoses and

* Part I appeared in the October, 1943, number

the more serious psychoneuroses who require hospital treatment

For example, C M H Q records, for the period covered by Hyland and Richardson's series, show that the total number of Category E medical boards on patients suffering from functional psychosis corresponds closely with their figures, whereas, in cases of mental deficiency, psychopathic personality and anxiety states, the total number of E boards is a great deal higher than that shown by the Neurological Hospital This apparent discrepancy is, of course accounted for by the fact that practically all psychotics in the C A (O) are transferred to that hospital, while in a high proportion of the other groups, (particularly those in which there is little hope of improvement by hospital treatment), disposal is made through General Hospitals, or by field and base area medical boards on receipt of out-patient reports by neuropsychiatric specialists

High Proportion of Invalidism Resulting from Psychiatric Disease

Psychiatric disabilities account for 30% of the total number of soldiers in the C A (O) who are invalided to Canada (see Tables I and II) This is comparable to the British and Canadian

Table I

Total Medical Boards Held on Patients in the Canadian Army (Overseas) Because of Functional Nervous Disease During the Period July 15, 1941, to July 15, 1942

	Total	*Cats A, B and C*	*Canada Cats D and E*
Psychoneuroses			
Anxiety states	356	55	301
Reactive depression	33		33
Hysteria	84	13	71
Depression	11		11
Psychoneurosis	47	5	42
Miscellaneous neuroses	30		30
Enuresis	9		9
	570	73	497
Psychoses			
Schizophrenia	113		113
Manic depression	34		34
	147		147
Mental Deficiency			
Mental deficiency	140	24	116
Mental deficiency with neuroses	26	2	24
	166	26	140
Psychopathic Personality			
Psychopathic personality	156	10	146
Temperamental instability	26	3	23
Psychopathic personality with drug addiction	1		1
Drug addiction	2		2
	185	13	172
Chronic Alcoholism			
Alcoholism	12		12
Migraine	3		3
Epilepsy	105	1	104
Total	1,188	113	1,075

The above diseases caused 30 6% of the total invaliding to Canada (from all diseases) during this period During the period February, 1940, to July 15, 1941, 477 neuropsychiatric patients, or 19% of the total, were invalided to Canada

Table II

Total Medical Boards Held on Patients in the Canadian Army (Overseas) Because of Functional Nervous Disease During the Period July 15, 1942 to December 31, 1942

	Total	*Cats A, B and C*	*Canada Cats D and E*
Psychoneuroses			
Anxiety states	417	178	239
Reactive depression	19	4	15
Hysteria	58	32	26
Depression	2		2
Psychoneurosis	31	20	11
Miscellaneous neuroses			
Enuresis	15	2	13
	542	236	306
Psychoses			
Schizophrenia	79	1	78
Manic depression	10		10
	89	1	88
Mental Deficiency			
Mental deficiency	146	74	72
Mental deficiency with neuroses	26	2	24
	172	76	96
Psychopathic Personality			
Psychopathic personality	149	38	111
Temperamental instability	15	3	12
Psychopathic personality with drug addiction	3		3
Drug addiction	3		3
	170	41	129
Chronic Alcoholism			
Alcoholism	10		10
Migraine	3	1	2
Epilepsy	58	13	45
Totals	1,044	368	676

The above diseases caused 31 72% of the total invaliding to Canada (from all diseases) during this period

Note In this survey idiopathic epilepsy is included in the functional nervous diseases, but not epileptic symptoms secondary to known trauma, tumour or infection

experience in the first Great War, and to the British Army figures to date in the present war To quote Rees [11]

"The invaliding or discharge from the army from all psychiatric causes has been approximately one third of the total invaliding, a figure which is comparable to the incidence of psychiatric illness in civil life in this and other countries"

The number of psychiatric casualties in the American Army in the United Kingdom, which were sufficiently severe to warrant evacuation to the zone of the interior, indicate that to date the American experience is no better than that of the C A (O) and British Army

The Importance of Constitutional Predisposition

Constitutional predisposition is present in over 80% of all cases This was noted during the first Great War, and was re-affirmed in the reports by the War Office Committee of Inquiry into "shell shock" in 1922,[1] and the Conference of the Board of Psychiatrists and Neurologists (Ottawa), 1936

The War Office committee reported

"Authorities are agreed that, in the majority of cases of war neurosis, there already existed a congenital or acquired predisposition to pathological reaction and that this constitutional characteristic was of vast importance"

"While one school of medical opinion is inclined to assign a greater influence to physical factors as exciting causes, and the other to psychogenic factors, there is a consensus of opinion that the only constant factor, *in the great majority of cases, is a constitutional predisposition* which may either be inborn or acquired in early life"[2]

Hyland and Richardson, in their analysis of 150 cases of psychoneurosis, state "Thus, 120 cases (80%) had shown evidence of nervous instability prior to enlistment, and one-half of these had suffered actual mental illnesses prior to enlistment"[8] If cases of mental deficiency and psychopathic personality (where the constitutional factor is present in all cases) were included, the percentage would be still higher Sutherland's figures in this connection are identical with those of Hyland and Richardson, and it is important to note that his series of 100 cases had been exposed to the stress of combat action, whereas the Canadian group had not Confirming evidence by many other writers could be quoted, but I will conclude with Gillespie's statement, already quoted by Hyland and Richardson "One of the medical lessons of the war will probably be that, in any well-disciplined force, psychiatric casualties, apart from mental defectives, are almost exclusively, although not entirely, among those temperamently predisposed, especially the 'constitutionally timid'"[6]

Poor Results in the Chronic Cases

Attempts to rehabilitate psychiatric casualties in the C A (O) to the point where they become useful combatant soldiers, have been very disappointing If these poor results were confined to the Canadian Army in England, I would believe that our methods are wrong (and perhaps they are) Unfortunately, our poor results compare favourably with the reports of other workers

Hyland and Richardson report that the follow-up of a series of 75 cases discharged from hospital after treatment for psychoneurosis, showed that after periods varying from three to fifteen months, only 25% remained well and efficient, and that this small group of "cures" had not yet been tested by the stress of active warfare The authors compare the above results with those of Sutherland,[5] where out of 100 patients treated in hospital for an average period of seven weeks, only 9% were returned to full duty, 19% were placed in a lower category and the remaining 72% discharged from the army, and Hadfield[7] in which only 20% were returned to duty, and of these only 60% (or 12% of the total) carried on satisfactorily after three months

Rees,[11] in discussing the "psychopathic tenth" of the population and their liability to neurotic breakdown in the army states

"The inaction and relative monotony that have been forced on so many units of the army in this country have tended to bring out neurotic tendencies which already existed, and much of our work in army psychiatry has been concerned with such cases Only a small proportion of these men are likely to benefit by hospital or out patient treatment sufficiently to warrant their being kept in the army In civilian life they were able to carry on in their own particular niches, going to the doctor when they felt it necessary"

After all the above mentioned discouraging experience with the "psychopathic tenth", it is a relief to turn to the brighter side—the incidence of occurrence and the recovery rate of psychiatric conditions occurring in normal individuals as the direct result of war

The larger number of psychiatric casualties which were expected, and which the E M S Hospitals were prepared to receive, from the bombing of London never materialized In retrospect, many reasons for this are apparent,

some will be mentioned because they concern morale in general

1 The majority of the population remaining in London after the enforced, or voluntary, evacuation, were of sound British stock, and they had work to do A high percentage of the "constitutionally timid" had left town

2 The bombing inoculation was in small doses and was less devastating than had been feared (I would remind you that in one of the later raids, a greater tonnage was absorbed by London in a single night, than that which shattered Coventry)

3 By the time the heaviest raids came, the Londoners were "seasoned troops" There had been lulls which enabled "regrouping of forces" and improvements in organization

4 In badly damaged districts, the unwounded were too busy putting out fires or digging people out of rubble to indulge in the luxury of "a nervous breakdown"

5 The Londoner's morale was good His country, his city and he, as an individual, were demonstrating to the whole world that they could stand up under the stress of severe enemy aggression "His" Air Force, which was little, was hitting back hard at the enemy's Air Force which was big, and inflicting terrific damage

In all this we see most of the factors which foster good morale good average human material to begin with, physical and mental activity (work), freedom from monotony, identification of the individual with a group which is giving a good account of itself, visible evidence of improvement in the efficiency of that group, and above all, the pride of accomplishment

Throughout the siege of Malta, the morale of both civil and military populations remained good It has been stated that few military psychiatric casualties were admitted to hospital, for two reasons First, psychiatric disability offered no relief from enemy bombing while they remained on the island, and there was no prospect of being evacuated from the island Second, no psychiatrist was available!

During, and following, the withdrawals from Norway, Dunkirk, Greece and Crete, and in some phases of the North African campaign (notably at Tobruk), acute psychoneuroses developed in British and Imperial soldiers who had not previously shown evidence of instability The reports of Rees,[11] Craigie,[10] Cooper and Sinclair,[9] and others, show that the results from treatment of these cases are much more gratifying than in the chronic psychoneuroses A high proportion of these cases are returned to duty, but not all to combat duty In the Middle East even some cases of frank psychosis made excellent recovery, and have been retained in the service As in the first Great War, it has been found that the cases of physical exhaustion, terror state and acute anxiety neurosis do better if they are given immediate rest, sedatives and reassurances and are not evacuated, but are returned to full duty as soon as possible

Comment

Neither new psychiatric approach to the problem nor personnel selection has solved the wastage of man power due to psychoneurosis in war Progress has been made in screening out the mentally defective and the grossly unstable at the point of intake None of the tests or batteries of tests now in use in the British, American or Canadian Armies accurately measures temperamental stability or moral fibre—"guts" The tests purporting to measure temperament are still in the experimental stage and are only useful when interpreted by an experienced worker The personal interview such as that used to supplement the "M" Test or by the psychiatrist, is time consuming, not suitable for mass testing and the results are only uniform when assessed by a skilled interviewer

Our experience confirms that of Baillie[4] — Soldiers are still arriving in England as reinforcements to the C A (O) who should obviously have been recognized as unsuitable during their training period in Canada Some have been released from detention or prison and almost immediately put on draft for overseas, without any psychiatric report to suggest why it is now considered that they will become useful soldiers, although their whole army histories are bad

Apparently the westward sea voyage across the Atlantic has a more beneficial effect upon mental health than the eastward one!

I am not convinced that the incidence of functional nervous disease in the C A (O) will be materially reduced by all the special measures which have been introduced To paraphrase Hubble [12] It is axiomatic in the treatment of the psychoneurotic, that hope of cure rests upon one's ability to offer the patient a greater gain than that afforded by his illness This point need not be laboured but

it briefly explains why, in an expeditionary force, a high percentage of cures cannot be expected

If the reader accepts the above statements he may well ask—"How then, are the special organizations outlined in this survey justifiable —Personnel Selection section of the Adjutant General's Branch, a Special Base Hospital, Regional Neuropsychiatrists, General and Special Pioneer Companies, Educational Companies, etc?" Perhaps they are not I believe, however, that they are, for the following reasons

(*a*) A large proportion of the Canadian soldiers now in England were enlisted before personnel selection was instituted at the points of intake During 1939 and 1940, there was still an economic depression in Canada and the Army attracted many who were either unemployed or were unsuccessful in civilian competition because of unreliability Many units and the earlier reinforcement groups came overseas after too brief a training period to allow for adequate weeding out of the unfit

(*b*) The selective tests now in use do not accurately predict which soldiers will break down under the stress of service Therefore, for the duration of the war, there will be need for constant sorting and disposal of psychiatric casualties

(*c*) The acute "war neuroses" are still to come This group offers the best hope of rehabilitation, and the present organization is planned to meet this need

(*d*) During the past nine months, the Pioneer Companies have amply justified their existence both in relieving the fighting units of the mentally defective and ineffectual soldiers and in getting useful work done

(*e*) It is a platitude to say that an army's killing power is not necessarily proportional to its man power, but it is one which will bear repeating Never before has the mentally defective or unstable soldier been in a position to do so much damage to expensive military equipment, or to so endanger the safety of others

There is need to sound a note of caution against too much specialization What is best for the individual is not necessarily best for the army, and this is not always appreciated by the enthusiastic specialist To be able to accurately weigh one against the other, requires wide military experience

The maintenance of good morale and the prevention of disabling functional nervous disease are still primarily the responsibility of the Unit Commander and the Regimental Medical Officer

There is still a tendency for both medical and personnel selection officers to recommend reallocation of a soldier to a specific job without having to remotest idea what physical or mental attributes are required for that job In reviewing files, it is not uncommon to see such comments as "Should be transferred to the Medical Corps" or "This soldier should adjust well to duties in a Base Unit", whereas the man's whole history indicates that he has not adjusted well to anything, except his meals, since the age of four!

During the unsettled and severe blitz periods, the incidence of psychiatric disease in the C A (O) was lower than in the monotonous period

There has been remarkably little nervous disease in the Nursing Sisters, R C A M C They were well selected they are young, but are past the age when psychiatric disorders usually are first manifested, they have no dependents they are working at the profession which they have chosen British and Australian A Ds M S report that in the Middle East Campaign, notably in the evacuation of Greece, the nurses stood the stress of war quite as well as the men

During the first six months of 1943, fewer psychiatric patients will be returned to Canada than during the past six months It is hoped that restricting the return to Canada will remove from the mind of the unwilling soldier the idea that nervous disease offers an easy and honourable escape from his distasteful environment How many psychoneurotic soldiers can be usefully employed in the (Special) Pioneer Company and at other non combatant duties remains to be seen At the end of June, 1943, the whole situation will be reviewed with the view to decision as to whether or not the present policy is sound

There is still much work to be done The psychiatric aspect of crime in the C A (O) is, in itself, an important field Practical psychology and psychiatry should play a larger part in the prevention of psychiatric disease and in morale in general This cannot be accomplished by pep talks by the consultant neuro-

psychiatrist It can, and I believe will be done by the neuropsychiatrist and personnel selection officers keeping in close touch with the problems of unit commanders and regimental medical officers

SUMMARY

A short history of the work and problems of neuropsychiatry in the Canadian Army during its first three years overseas has been presented The three years may be divided into three periods The unsettled period from December, 1939, to early autumn, 1940, the severe blitz period from September, 1940, to May, 1941, the monotonous period from May, 1941, to January, 1943 The active warfare period is yet to come Although the clinical entities have remained the same throughout, the precipitating causes of psychoneurotic breakdown and the problems of disposal have been different in the three periods, and it is expected that the problems will be very different during active warfare

A brief outline of present policy and organization has been given These have been evolved by trial and error and by keeping in close touch with the progress made by the other services, particularly that of the British Army at home and abroad We believe our present organization to be sound It is more flexible than that at present in use in either the British or American Armies Base Area neuropsychiatry, as presently constituted, should require little modification as long as the C A (O) remains based in England This consists of the Canadian Neurological Hospital and two regional neuropsychiatrists attached to two large General Hospitals in C R U area When the C A (O) goes abroad, neuropsychiatry in the forward area will be guided by the regional neuropsychiatrists, who are now employed in field work in England

Decision has yet to be made as to the requirements on lines of communication and at overseas (continental) base when the C A (O) goes abroad There are two alternatives—either we treat neurological casualties in General Hospitals and set up special light units for psychiatric casualties, (comparable to those which the British Army had in North Africa), or treat all neuropsychiatric casualties in General Hospitals At present, I favour the latter course and in line with this policy, officers from the medical divisions of four Canadian General Hospitals have taken courses at the Canadian Neurological Hospital

Our problems, results from treatment, and conclusions are found to be comparable with those of the British Services and the American Army in Britain Some statistics are quoted but a detailed statistical study is reserved for a later report

Neuropsychiatric problems in war have not materially changed since the War Office Committee on "Shell Shock" published its report in 1922. Out of the mass of literature published on the subject in the past twenty-six years, four salient facts emerge These cannot be overemphasized

1 Psychiatric disabilities account for approximately 30% of all casualties invalided out of the Army during war

2 Of these, over 80% show definite evidence of constitutional predisposition to psychotic or neurotic breakdown, or have constitutional defects such as mental deficiency or psychopathic personality

3 In chronic or recurrent cases, where the above constitutional factor is present, the results from treatment are poor Less than 25% of cases are rehabilitated to the point where they become useful combatant soldiers

4 Psychoneuroses (including exhaustion states), occurring in stable personnel as a result of severe battle stress, respond well to early and adequate treatment and should not, as a rule, be evacuated to base general or special hospitals

The work of the personnel selection board has been mentioned but not discussed Selection work in the C A (O) is not comparable to that in Canada Because of the time and money already spent on men who should have been weeded out during early training in Canada, and because of the Atlantic shipping situation, an attempt is being made to usefully employ many men who belong to the "psychopathic tenth" of the population The personnel selection board, therefore, is apt to be unjustly blamed because some of these men who are virtually unplaceable in the C A (O) do not make good after reallocation

We have really very few square holes in the C A (O), and if square pegs are forced into the round ones, even with the aid of a psychiatrist and a personnel selection officer, they will still pinch in places and in others be too slack

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GUNSHOT WOUNDS OF THE HEAD

(A Review of the After-effects in 500 Canadian Pensioners from the Great War, 1914-1918)

By William O Gliddon, B A, M D, C M

Department of Pensions and National Health

DURING the past few years, more especially since the start of the present war, many articles have been written relating to the after effects of head injuries, and much thought has been given to the subject, particularly if these head injuries are caused by metal projectiles These articles generally stress the seriousness of head injuries, and mainly centre around the probability of the development of epilepsy

Many varying statements have been made in reference to the frequency of epilepsy Ascroft, in the *British Medical Journal* of May 17, 1941, stated that 34% of head injuries had developed epilepsy and that, where the dura had been penetrated, 25%, Cushing's statistics show that epilepsy developed in 45% of non-penetrating injuries and 36% of penetrating injuries, Credner states the incidence is 49 5%, Rawley found 25%, Wagstaffe, in his review, shows an incidence of 9 8% of epilepsy and, if the dura is penetrated, 18 7%

In order that an unprejudiced and independent review of the after-effects of gunshot wounds of the head might be prepared, the officer in charge of records for the Department of Pensions and National Health was asked to provide a list of 500 cases of individuals in receipt of pension for these after-effects The cases were obtained, therefore, from the pension lists, not from the treatment statistics of any hospital or clinic

* Summary of a paper presented before the Montreal Neurological Society, March 17, 1943

Before considering the statistics compiled in this review of 500 cases, some points should be emphasized The statement made by Stephenson that statistics considered by medical observers are fallacious, as only cases requiring treatment are reviewed, does not apply to this particular review, noting that these 500 cases were obtained from the pension lists, not the treatment statistics of any hospital or clinic In 1936 these men were alive and in receipt of pension for disability resulting from a head wound Twenty-three (4 6%) have died since of various causes, one only (status epilepticus) as a direct result of the head injury There was no selection of cases, except that only gunshot wounds of the cranium were included All gunshot wounds of other than the cranial bones were eliminated, as were also head injuries resulting from accident, such as motor car mishaps All cases having had one incident labelled epilepsy or epileptiform at any time *following the head injury are included as having epilepsy*

The 500 cases reviewed show 49 cases of epilepsy, *i e*, 9 8% Other articles state that in any series of cases there must be some epilepties that are missed Even if this were possible with the pension and treatment system in effect in Canada, it would apply at least equally to this review Also, some are listed as epileptic when it is fairly definite that the condition should not have been diagnosed as epilepsy

The first table indicates the tissue involved in the injury, *i e*, the scalp, fracture with the dura intact, and fracture with the dura penetrated or torn If, from the documents, there is a doubt, the case is not listed as showing penetration or tearing of the dura However, if there has been a penetrating foreign body which either has remained in the brain or has been removed, it is considered the dura has been torn, although not specifically mentioned

This table shows that of the 500 cases, 130 were scalp wounds, *i e*, 26%, some noted as being dirty and infected Of these, as indicated by the first black shaded portion of the graph, five had at one time shown epileptic attacks This means that 3 8% of the scalp wounds are listed as epileptic, and of the total number of epilepties, 10 2% followed scalp wounds

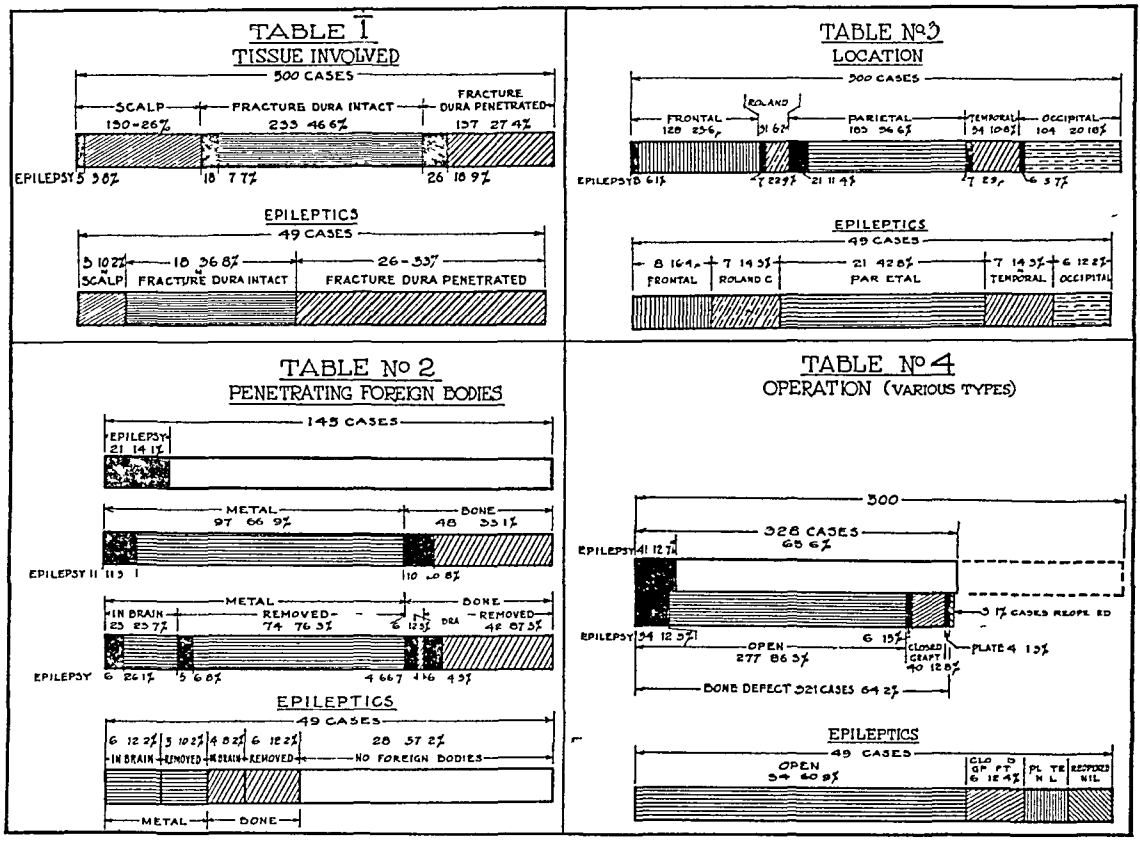
The second portion of this table shows that a total of 233 cases, or 46 6% of the cases re-

viewed, had suffered fracture without tearing or penetration of the dura Of these, 18, or an incidence of 7 7%, are listed as epileptics Of the total number of epileptics, therefore, 36 8% are in this category

The third section of this table refers to the cases with fracture and penetration of the dura These totalled 137, *i e*, 27 4% of the cases reviewed Of these, 26 are shown as epileptic, which means that the incidence of epilepsy is 18 9% if the dura is penetrated Also, of the total number of cases of epilepsy, (49), 26, or 53% are in this class This agrees with statements made in other reviews indicating that the liability to the development of epilepsy is greater if the dura is damaged However, 18 9% is much less than the 45% as given by Ascroft, the 49 5% by Credner, or the rough estimate of 40 to 50% given by Cairns, but practically the same as the 18 7% arrived at by Wagstaffe

The second table deals with the cases where penetration of a foreign body into the brain substance is definitely proved either by evidence at the time of operation or x-ray examination These total 145, or 29% of the cases reviewed Of these 21, or 14 1%, show epilepsy

These cases are subdivided into whether the foreign body is metal or bone, and also whether removed or remaining in the brain tissue Only those cases in which complete x-ray examination, repeated after discharge from the army, confirms the presence of a foreign body in the brain substance are listed as such



The total cases showing metal penetration number 97, with 11 cases of epilepsy, or an incidence of 11 3% Of these, in 74 cases the metal was removed and there are 5 cases of epilepsy, or an incidence of 6 8% With the metal remaining in the brain tissue are 23 cases, 6 of which show epileptic attacks, or an incidence of 26 1% With penetration of bone there are 48 cases, 10 of which are epileptic, an incidence of 20 8% Of these, in 42 cases the bone fragments were removed—6 cases of epilepsy or an incidence of 14 3%, and there are six cases in which bone fragments are demonstrated as remaining in the brain, 4 of which are epileptic, an incidence of 66 7% There is probably a rather large percentage of error here, as numerous cases with bone frag-

ments remaining in the brain substance are missed at subsequent examinations

Of the 49 cases listed as epileptic, 21, or 42 8% are in the category of penetrating foreign bodies These are practically equally divided as follows

Metal removed	10 2%
Metal in brain	12 2%
Bone removed	12 2%
Bone in brain	8 2%

It will be noted, therefore, that although the incidence of epilepsy is 18 9% where the dura is torn, it is, however, only 14 1% where there is definite evidence of the damage having been done by penetrating foreign bodies Several cases noted at time of operation a tearing of the dura where there has been no penetrating foreign body Also, the incidence of epilepsy would appear to be much higher when the foreign body is bone, rather than metal, and very high if a bony foreign body has remained in the brain substance

Table 3 indicates the location of the original injury If more than one cranial bone was involved, the site of the injury is considered to be where the major part of the damage has been done

The frontal area shows 128 cases, or 25 6% of the total cases reviewed, with 8 cases of epilepsy, *i e*, an incidence of 6 1%

The Rolandic area shows 31 cases, *i e*, 6 2% of the total, with 7 cases of epilepsy, an incidence of 22 9% Undoubtedly there is an error here, as only those cases are listed as being in the Rolandic area where the area is definitely mentioned, or where there has been a hemiplegia or monoplegia Many of the cases listed in the next section (parietal area) doubtless involve the Rolandic area of the brain, either directly or by a foreign body travelling at an angle from the point of entry

The third subdivision is the parietal area, with a total of 183 cases, or 36 6% of the total, with 21 cases of epilepsy, an incidence of 11 4%

The temporal area includes 54 cases, or 10 8% of the total, with 7 cases of epilepsy—12 9%

The cases in the occipital area are third in frequency, with a total of 104 cases, or 20 8% of the total with 6 cases of epilepsy, an incidence of 5 7%

These figures show that the incidence of epilepsy is undoubtedly, even allowing for error, greater if the Rolandic area is involved

Considering the total number of cases of epilepsy (49) the following percentages are arrived at

Frontal	16 4%
Rolandic	14 3%
Parietal	42 8%
Temporal	14 3%
Occipital	12 2%

Table 4 indicates the number of cases (328, or 65 6% of the total) in which there is a definite note on the service documents of an operation having been performed These operations vary from excision of damaged scalp tissue to removal of bone with exploration of the brain and removal, if possible, of foreign bodies

In these cases there are 41 epileptics, *i e*, an incidence of 12 7% The case records show a total of 277 cases where a portion of the skull has been removed and no closure attempted Of these, 34 are epileptics, an incidence of 12 3% In 40 cases the opening was closed with either a cartilaginous or bone graft 6 of whom, or 15%, are epileptic Four cases were closed with a plate, and there were three cases where the graft was removed, none of which show epilepsy

Of the total number of cases of epilepsy (49), 34, or 60 9%, show an opening in the skull and six, or 12 4%, where the opening has been closed with a graft

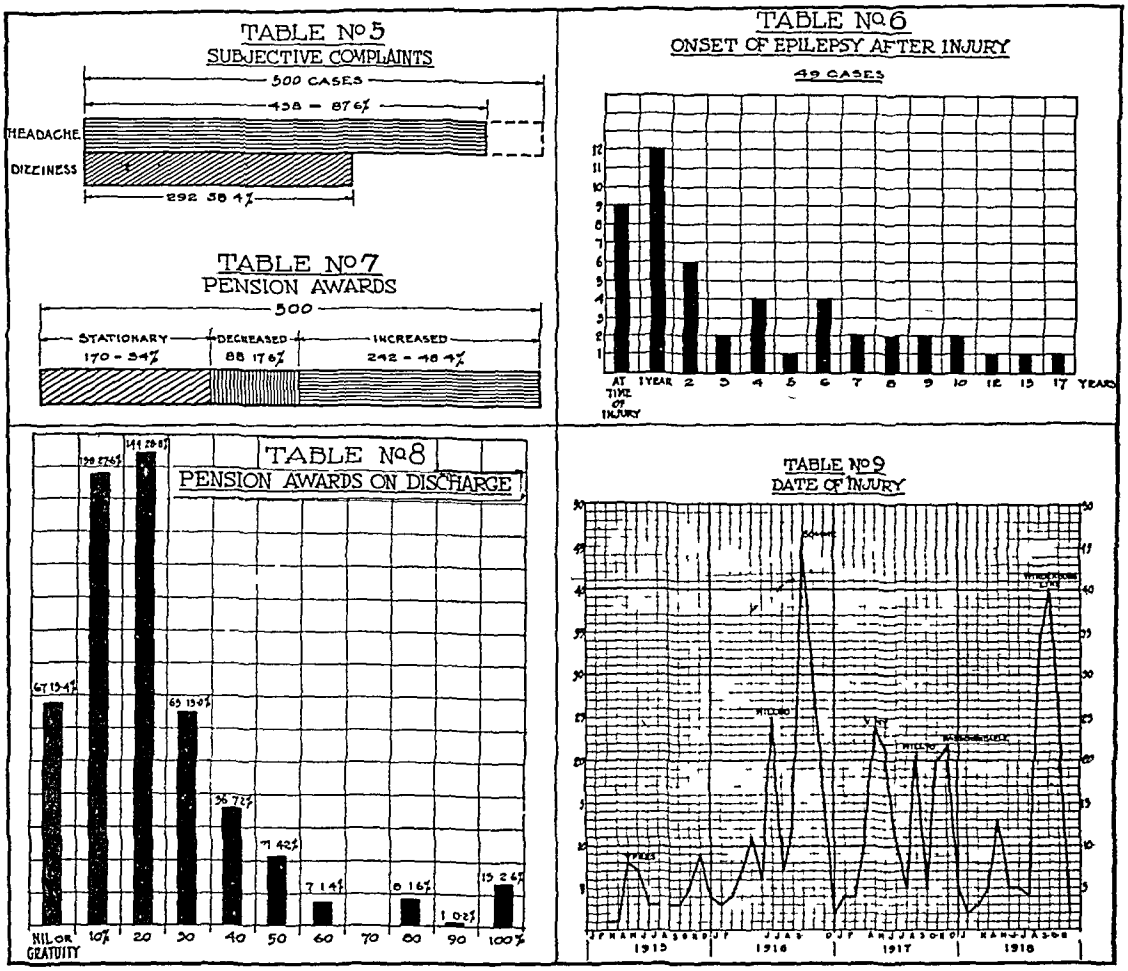
The incidence of epilepsy in these cases is therefore slightly higher than the average, but it is considerably less than where there has been a penetrating bony foreign body, and also where the foreign body, either metal or bone, has remained in the brain substance

Table 5 refers to the incidence of the subjective complaints of headache and dizziness regardless of the location, type, or result of the original injury In 438 cases, or 87 6%, there is found on the documents complaint of headache, generally first mentioned during the convalescent period following the period of hospitalization for the injury This complaint is variously described as head pain, generalized headache, or headache localized to the area of injury on the scalp If there has been a penetrating wound or a retained foreign body at some distance from the point of entry, the head pain is either general or localized to the point of entry on the scalp, not where the actual damage to the brain tissue has been done

The cases where dizziness is recorded total 292, or 58 4% of the total, generally described as occurring only on stooping or lifting

It was noted in reviewing these cases that if a severe after-result of the head injury was present, such as a persistent hemiplegia, the complaint of headache was not made, whereas, on the contrary, patients with a superficial scalp wound or fracture of the outer table stated to be severe and fairly continuous, does not appear to interfere materially with employment

The statement has been made that dizziness following head injury is more or less the equivalent of epilepsy However, this review shows that the subjective complaint being present in practically 60% of the cases, indicates that this complaint of dizziness is far



would complain of severe and persisting headache out of all proportion to the extent of the injury

It is also noted that the headache continued in spite of post-discharge treatment, which appears to have very little permanent effect on the complaints Following encephalogram there may be stated to be a temporary relief, but within a year or at the time of the next pension examination, the complaint of headache is just the same as it was before In only six cases is there noted the excessive use of aspirin or sedatives The headache, even when more frequent than any definitely recorded frequency of epilepsy

The rôle of sepsis accompanying or following a head injury as a cause of future complications, such as epilepsy, has received considerable attention From this review it was not considered possible or advisable to make any very definite statement Unfortunately, many of the references contained in the army documentation to infection are vague and in other instances, where from the description of the injury, sepsis would be expected, it is not mentioned in the case reports

Cerebral herniation is apparently very infrequent In this entire series the condition is described in only 3 cases

Table 6 indicates the duration of time between the injury and the first recorded epileptic attack The majority of cases of epilepsy (21—43%) appear during the first period of hospitalization or in the first year following the injury It will be noted that one case did not show epilepsy until seventeen years after the gunshot wound

Tables 7 and 8 should be considered together and are of interest as indicating the degree of disablement following a head injury

It will be noted in Table 7 that 34% of the original awards remained stationary, and 17 6% were decreased prior to December 31, 1942 Less than one-half, or 48 4%, had been awarded an increase in pension over the number of years since discharge from the army this in spite of changes of legislation, difficult economic conditions, and other factors Combining these two tables would show that the head injury case is not seeking compensation, but has been re established It was even noted that some had enlisted in the present war

Table 8 shows the degree of disability as assessed for pension purposes at the time of discharge from the armed services It is interesting to note that 67, or 13 4%, were assessed as negligible, or were awarded a gratuity The Canadian Pension awards of monthly payments based on an assessment of the individual's abilities in the general labour market, start at 5% Including those not granted pension, the total up to and including awards of 30%, is 414 of the 500 cases reviewed, or 82 8% of the total As pension assessments are generous, and dependent largely on subjective complaints, this would surely indicate that the degree of disability after a head injury is not very great

Table 9 is merely of interest, indicating that the occurrence of the injuries coincides with the larger engagements in which the Canadian Forces participated

Statistics were also kept of the length of time between the injury and discharge from the forces, although not prepared in table form These show that 61 cases, or 12 2%, were discharged within six months, 178, or 35 6%, within a year, and 135, or 27%, up to a year and a half Therefore, 77 2% remained under hospital treatment and in convalescent camps up to one and a half years following the injury This would not appear to be too high an average The majority who remained in the army for a longer period of time were returned to duty and were not discharged until demobilization

To summarize, a review of 500 Canadian ex-service men from the last war receiving pension for the after effects of gunshot wounds of the skull show an incidence of epilepsy of 9 8%, which is undoubtedly the maximum

Where the dura was torn the incidence increased to 18 9%

Retained foreign bodies apparently increased the incidence of epilepsy—retained metal being 26 1%, and retained bone 66 7% Of course, a review of another series of cases might alter these percentages, especially that of retained bone

The frequency of epilepsy is greater if the Rolandic area is damaged

The type or location of the injury does not appear to affect the subjective complaints, as 87 6% show a record of headache Operative procedures after discharge did not appear materially to affect these complaints

As 58 4% show complaints of dizziness, this can hardly be considered as an epileptic symptom or equivalent, especially as over a long period of years no other signs or symptoms developed, and there is no indication of the epileptic constitution

The occupational handicap following head injury is not great, as 82 8% are assessed at 30% or less, and the assessments of the Canadian Pension are generous

RESUMÉ

Sur 500 ex soldats de la guerre de 1914 18, pensionnés pour sequelles de blessures crâniennes par armes à feu, 9 8% présentent des crises épileptiques Dans les cas où la dure mère a été lacerée, la frequence de l'epilepsie monte à 18 9% Quand des particules metalliques ou osseuses restèrent dans la plaie les convulsions subséquentes furent encore plus frequentes 26 1% dans le premier cas et 66 7% dans le second L'atteinte de la zône de Rolando est particulièrement epileptogène Dans tous les cas, la cephalée figure dans un pourcentage de 87 6%, les malades opérés inclus Les 58 4% des cas qui se plaignent de vertiges ne sont pas intégres dans la statistique d'epilepsie En general, les malades peuvent travailler sans gros handicap JEAN SAUCIER

SOME LIFE-SAVING PROCEDURES IN OBSTETRICS

By H B Atlee, M D C M, F R C S (Edin), F R C S (C)

Halifax, N S

IF, perhaps, I should apologize for the pretentiousness of my title, there is certainly no need to apologize for my intention, which is a further reduction of our still too high maternal and neonatal mortality rates We have two reasons to be concerned with these rates (1) the small size of the modern family which, among the Anglo Saxon portion of Canada, is not large enough to sustain our numbers, and (2) the fact that so many of our young men are away at the war at the height of their breeding capacity, and a considerable number of them will not return Such being the case we have a special duty to look to those holes in our fences through which death creeps to cheat us of mother and child

Blood Transfusion

I wonder if we are as blood transfusion-conscious in obstetrics as we are in surgery? I do not say that we fail to think of transfusion in this connection, but the continued maternal mortality from hæmorrhage is surely evidence that we do not think of it in time Just so long as we wait until the patient is showing signs of severe blood loss before preparing for it, that long will we continue to have deaths For the effects of hæmorrhage are subtle the vasomotor system, by contraction of its arterioles, takes up the slack for a considerable time the pulse and general condition remain surprisingly good despite the continued bleeding, and then suddenly, as the vasomotor system lets go, we are faced with disaster If we have waited until now to prepare a transfusion, we have waited too long What we really should do is to prepare for the bleeding before it occurs

With this in mind, let us consider the following conditions (1) anæmia at the onset of labour, (2) abortion, (3) placenta prævia and abruptio placentæ, (4) post-partum hæmorrhage, (5) ectopic gestation

Anæmia at the onset of labour —It should be a routine part of prenatal care to do a hæmoglobin estimation during pregnancy, and the earlier the better If anæmia is present it can then be treated without pressure from time Probably most women in the lower economic groups require to take iron during pregnancy in order to maintain their blood in a proper state Some authorities believe that there is in all women a physiological anæmia during pregnancy I do not believe that any anæmia is physiological I believe, further, that the anæmia which occurs in pregnancy is due in the main to an inefficient diet, and that where it occurs the woman should be given iron until the hæmoglobin returns to normal

Why should anæmia be so treated? Because the anæmic woman can stand less blood loss during labour than the normal woman, and because she is much more liable to infection What proof have I of these statements? The following (1) in two cases of death from postpartum hæmorrhage in my service at the Grace Hospital the women were anæmic at the onset of labour and their blood loss was not sufficient to have killed a non-anæmic woman, (2) almost invariably the patients I see in my service at the V G Hospital suffering from severe puerperal infections are grossly anæmic We can therefore prevent death from hæmorrhage and infection by building up a woman's blood during pregnancy But if that has been impossible and the woman enters labour in an anæmic state, she should be matched for a transfusion and have a donor made available immediately her condition is discovered We have a rule now at the Grace Hospital to this effect But in order to carry out this rule it is necessary to do a hæmoglobin estimation on every woman when she enters hospital

Abortion —The two death-producing factors in abortion are sepsis and hæmorrhage I do not propose to say anything about the treatment of puerperal sepsis except to remind you of the value of fresh air Unquestionably this is a life-saving procedure which we grossly neglect in this climate Yet I have seen patients so desperately ill from sepsis that they responded neither to blood transfusions nor the sulfa drugs, who turned the corner when they were put outdoors on a verandah for 24 hours a day Like spiritual salvation fresh air is intangible, and in this material age we neglect the intangibles — to our physical as well as spiritual deaths

* Paper presented at the 90th Annual Meeting of the Medical Society of Nova Scotia, Kentville, N S, July 7, 1943

We should not get deaths from *hæmorrhage in abortion*, but we will continue to do so if we treat abortion lightly The fact that we do treat it lightly is made evident almost every week in my service at the V G, where patients are often admitted so gravely anæmic that only an immediate transfusion saves them The aborting patient should be treated in hospital should be sent to hospital the moment she starts to abort, since only in hospital can hæmorrhage be treated early and quickly When, in such circumstances, hæmorrhage becomes excessive, the uterus can either be cleaned out or packed, before the woman is bled out If it is decided to pack, do not just stuff some packing into the vagina this is a stupid and dangerous practice The packing, to be effective, must go into the uterus and must be tight If it is tight there will be no further bleeding of any consequence and there is ample time to prepare for a transfusion But be sure to give the transfusion if the patient is badly bled out You may have stopped the bleeding, but the woman is still in that dangerously anæmic state where infection is likely

Placenta prævia and abruptio placentæ—We have likewise a rule at the Grace Hospital that the woman who is admitted at or near term with vaginal bleeding shall have a donor made immediately available even before anything is done to establish the correct diagnosis Why did we make this rule? Let me illustrate one of our reasons by describing what happened in a case of my own of this nature The patient came into hospital with a history of a very slight bleeding the night before I examined her and felt the placenta prævia Despite the fact that I decided on immediate Cæsarean section she bled so badly in the three-quarters of an hour that it took to get ready, that I had to give her a transfusion before starting the operation That is the sort of thing that happens in trying to diagnose by vaginal examination between prævia and abruptio without being ready to operate at once It is better to have everything ready for immediate operation where placenta prævia is suspected before doing a diagnostic vaginal examination It may not be necessary to do a section it may be a partial prævia that can best be handled by vaginal delivery it may be abruptio but if an operation is necessary the patient has not bled out and there is some hope of getting a live baby

The second reason for having a blood transfusion made immediately available where either abruptio or prævia is suspected, is that in the vast majority of these cases it will be needed In some the need will be urgent in others it may only be required as a preventive of sepsis, but it will be needed In this connection the parable of the foolish virgins is extraordinarily apropos

Postpartum hæmorrhage—I do not propose to go into the details of the usual treatment of this condition, which is so well known, but to mention two more or less new procedures (1) intravenous pituitrin, and (2) intravenous ergometrin, at the time the baby's body is being born Intravenous pituitrin is dramatically rapid in its action if you do get an effect you get it within a matter of seconds, but the pituitrin *must be well-diluted otherwise you may get pituitary shock* Not less than 5 c c of saline should be used to dilute 3 units of pituitrin Pituitary shock is a very real thing I saw one woman die of it and another come nerve-wrackingly close to it Intravenous ergometrin, given immediately the baby's head is born, is being used in some clinics to shorten and prevent blood loss during the third stage I have not used it this way, but have given it intramuscularly immediately the baby was born *It does shorten the third stage very considerably*, and is worth giving routinely in long-drawn out labours where there has been uterine inertia

Ectopic gestation—In the old days when operating for ectopic gestation we foolishly emptied the abdomen of the collected blood and discarded it Today, before starting to operate we do two things first, we have everything ready to collect and citrate the blood, secondly, we have intravenous saline going into one arm so that we can start transfusing the blood back into the patient while we are still operating on her In some cases we have given back in this way over 3,000 c c of blood one patient I recall was actually gasping her last when we began to pour the blood back, she was in excellent condition when she left the table as a result of the auto-transfusion In an acute ectopic do not wait to get a donor you can open the abdomen and auto-transfuse long before you can get a donor ready Since, by auto-transfusion, you restore almost all the blood the patient has lost a hetero-transfusion is rarely necessary

ASPHYXIA NEONATORUM

Four factors tend to produce this condition, (1) over-sedation of the mother in an attempt at painless childbirth, (2) such obstetrical manœuvres as difficult forceps, podalic versions, breech deliveries, (3) long drawn-out labours where the membranes have ruptured early, (4) prematurity complicating normal as well as difficult labour

Over-sedation—Just so long as we attempt to achieve painless labour by the use of such general sedatives as morphia and its derivatives the barbiturates and deep terminal anæsthesia with ether, that long will we continue to have dangerous asphyxia neonatorum I believe that the time has come to call a halt to over-sedation in obstetrics, and I think our profession might well begin to protest against articles appearing *in the lay press on the matter*, in which all sorts of miraculous claims are made There is no drug that, given to produce general sedation in the mother, does not adversely affect the baby's respiratory centre So long as we continue to give such drugs we will have babies which (1) we cannot resuscitate, or (2) become so depressed as a result of delayed resuscitation that they die within the first week or so of atelectasis Some pædiatricians go so far as to claim that many asphyxiated babies suffer from permanent brain damage as a result of it Despite the lay press and despite the clamour of women themselves for painless childbirth, I believe that we should take a definite stand against over sedation

What can we do for the pains of the woman in labour? Unquestionably we shall have to continue to give some general sedative, but our aim should be to reduce this to a minimum We should aim at relieving the worst of the pain, rather than abolishing it entirely We can also make greater use of *local anæsthesia*

Let us deal first of all with a very simple procedure—local infiltration of the perineum All that is required for this is a 20 c c syringe and some 1% novocaine solution Under such anæsthesia an absolutely painless episiotomy can be done I have put on low forceps after such an episiotomy and delivered the baby with surprisingly little pain, although I usually add a little terminal ether If the ether is stopped when the baby is born the episiotomy can be sewn up without pain

A more extensive anæsthesia can be obtained by guiding the needle up the ischio-rectal fossa with a finger in the vagina to the neighbourhood of the ischial spine and so anæsthetizing the internal pudendal nerve, the perineum also being infiltrated

Finally there is the *new continuous caudal anæsthesia*, about which we are hearing a great deal these days I have attempted this on nine patients, but without the results claimed by its authors In some cases I have produced a local anæsthesia of the vulva, but I have not yet succeeded in abolishing the abdominal pains Perhaps my technique is faulty but I have had it checked by one of my colleagues who does a large number of caudal anæsthetics in another connection, and he could find no fault with it I am continuing with the method, but I must confess that so far I cannot agree that it is the complete answer to the problem

Before leaving the subject I would like to say something about anæsthesia in Cæsarean section It is the experience of every one performing this operation under ether that some of the babies are badly asphyxiated, and that a small percentage cannot be resuscitated Because we so often do the operation for the baby's sake, this is a serious consideration Sometimes we operate because the baby is actually showing signs of fetal distress But in all cases where we do an operation that carries a greater risk to the mother than vaginal delivery, we should leave no stone unturned to get a live baby

For the last two years I have done all my Cæsarean sections under local anæsthesia At first I used nothing but the local, infiltrating the abdominal wall and the peritoneum over the uterine incision The operation is not completely painless One gets through the abdominal wall with practically no pain, but the incision into the uterus and the actual delivery of the baby does cause ten minutes of pain comparable to ten minutes of the worst of the second stage There is less pain if the patient is kept engaged in *conversation by an anæsthetist* Lately, I have modified the procedure when the abdomen is opened and packed away, the anæsthetist starts to give nitrous oxide and continues until the uterus is sewn up, the abdominal wound being sewn quite painlessly with the patient out of the anæsthetic This seems to me to be the anæsthetic of choice for this operation, particularly where the mother is toxæmic, and where there is placenta prævia or abruptio or any other condition causing devitalization of the baby What one notices in all

these cases is that the baby cries lustily the moment it is born And is not that the desideratum in all births—to have the baby cry lustily immediately it is born?

Why not use spinal anesthesia? Because it is a dangerous anesthetic method from the mother's standpoint Year after year the late Joseph B DeLee gathered statistics in his annual Year Book to show the dangers of this anesthetic in childbirth I do not see how anyone who has followed his proof can continue to use it

Asphyxia due to damage to the child in difficult forceps breech deliveries etc—There are two ways of applying forceps We can apply them cephalically or we can apply them pelvically In the baby's head is lying in the antero posterior diameter of the pelvis the two coincide —a pelvic is a cephalic application But if the head is lying in transverse arrest or in one of the obliques and we apply the forceps to the side walls of the pelvis we do not get a cephalic application It is here that we do the most serious damage to the fetal head Babies can stand an enormous pull without damage if the forceps are applied so that the blades lie fairly along the sides of the face but if the blades lie in any other position anything but the lightest pull is likely to cause damage This means that in all transverse and oblique arrests of the head we should leave no stone unturned to get a cephalic application either by the Melhado key in lock or manual rotation This means again that in applying forceps in all cases where the head is not actually showing at the vulva we should determine its exact lie, and should not be content to push the blades in along the pelvic wall on each side If we all insisted on cephalic forceps applications we would lose fewer babies

Breech delivery and podalic version—Breech delivery causes a considerably higher percentage of asphyxia and serious brain damage than vertex delivery For that reason we should try to turn all breeches to heads before labour sets in Sometimes this is easy, sometimes it is impossible, but we should always try it Where we have failed we should deliver the woman in hospital where every facility is available Unfortunately, *podalic version* is an easy way out of a great many obstetrical difficulties, but the actual need for it has become less and less as our other methods have improved It is unnecessary in posteriors and transverse arrests if one has mastered the Melhado method It is unnecessary in partial placenta prævia if a Willetts' forceps is used, or a heavy volsellum in lieu

Asphyxia due to prolonged labour—In a prolonged labour we have two factors causing asphyxia (1) the necessity of giving more sedative than usual, (2) the effects on the baby of pressure in the pelvis when the membranes have ruptured early I have already dealt with (1) Unfortunately, in many cases of disproportion and posterior position the membranes do rupture early In this type of case I believe that we can save babies by putting on the forceps—after deep episiotomy—when the head is visible with the pains This is particularly true in dealing with primipare and it is true whether the baby is showing signs of fetal distress or not If, of course, there are signs of distress—as shown by the fetal heart or the passage of meconium stained fluid—there is all the more indication for it

Premature babies—The more I see of premature babies the more I believe that they should be helped across the perineum whether there has been a long labour or not, but most certainly if there has been a long labour I make it a practice with all prematures to do an episiotomy where the head does not come through almost immediately I lift it through I believe not only that you prevent asphyxia by doing this, but you give the baby a better chance of being born without serious damage to its brain Only recently a post mortem at the Grace Hospital in a spontaneous birth of a premature infant following an easy labour showed the ventricles full of blood

Some people are afraid to do deep episiotomies, afraid of some permanent damage to the perineum resulting I have no patience with this sort of argument A perineum can always be sewn up, but a dead baby is a dead Canadian Better a perineum through which you can drive a coach and horses, than a baby that dies or grows up to inhabit a home for the feeble minded

The actual handling of the asphyxiated baby—Do not cut the cord! And once again, gentlemen, *do not cut the cord!* Leave the baby attached to its mother until the cord has stopped pulsating at the vulva and until it has lost its bluish grey sheen If you take that precaution you allow to flow into the baby from its placenta from 50 to 100 c c of rich, red blood If you

will take a pencil in hand and calculate this thing mathematically, you will find that 50 c c of blood flowing into a baby of 8 pounds is the equivalent of a 1,000 c c transfusion to an adult of 160 pounds Why waste this blood because you are in a hurry? When I think of all the blood that flows from all the umbilical cords that are cut too soon each day of the year, I see a stream of life whose waste is appalling and inexcusable But all the more so does the asphyxiated baby need this extra blood So keep it attached to its mother while you resuscitate it

The next important step is to *clear the baby's air passages* Despite tracheal catheters, I believe that the best way to do this is to hold the baby upside down, its back against your forearm, your index and middle finger over each shoulder, the finger of your other hand milking the trachea Keep milking until all the mucus has come away To clear the mouth and nasopharynx insert your forefinger into the back of the baby's throat and draw it out quickly, exerting suction The suction is more effective if you get *someone to press* the baby's nostrils together Do not hold the baby up by the ankles, which are slippery By adopting the above procedures you will very seldom require the tracheal catheter I have not had to use it in the last two years

Having cleared the trachea *get the baby into a basin of warm water* and keep it there while you carry out artificial respiration It is most important to conserve the baby's body heat, since any great drop in heat is seriously devitalizing But how, you will ask, can you get the baby into warm water if it is still attached to its placenta? I have overcome this difficulty at the Grace Hospital by delivering the type of patient in which an asphyxiated baby is likely in the lithotomy position, and have had built a sort of baby carriage that pushes right up against the mother's buttocks Into a hole in its top is placed a sterile basin containing the warm water Unless the cord is abnormally short resuscitation can be carried out in this life saving warmth without separating the baby from its blood transfusion It cost me $4 59 to make this buggy

Be sure to have your equipment for resuscitation available the moment the baby is born This means that in all difficult deliveries, in all cases where there are signs of fetal distress, all preparations are made before the baby is born In this way no precious moments are lost, and the pædiatricians will bear me out that it is the first moments of a baby's life that are the most important

Many of the procedures I have outlined above can only, it must be confessed, be carried out in a hospital But since these days more and more women are being delivered in hospital, there is no reason why every hospital in which obstetrics is practised, should not be equipped to undertake them We can only continue to lower our mortality rates by paying attention to the type of details I have mentioned in this article—details which, at first sight may seem to be very small, but which in effect can become very great

RADIATION THERAPY IN CARCINOMA OF THE BREAST

By Jean Bouchard, M D , D M R E (Cantab)

Royal Victoria Hospital, Montreal

THERE is no question that in cancer of the stomach, radical surgery, if practicable, is the only treatment which has given results Radiation so far has been of no use On the other hand, it is generally admitted that carcinoma of the cervix uteri should be treated with radium- and roentgen-therapy, regardless of the stage

However, as regards carcinoma of the breast, the profession has not arrived at a consensus as to the best way of tackling the disease, whether (*a*) by surgery alone, (*b*) by radiation alone, or (*c*) by a combination of surgery and radiation A great multiplicity of opinions, often *controversial, if not diametrically opposed,* courses through the medical literature on the subject This is partly due to the fact that the problem in itself is frightfully complicated, and also because the results of the treatment of cases which are not at all comparable, are too often compared Discrimination in discussing the treatment of cancer of the breast is important This is a disease which cannot be considered "en bloc" Each case presents an individual problem requiring very careful investigation

* From the Department of Radiology (Service of Dr Charles B Pearce), Royal Victoria Hospital, Montreal

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and clinical classification as to the extent of the pathological process, in order to determine the treatment to be applied both to the primary growth and to its secondaries, and to permit subsequent adequate interpretation of the result with any selected method of treatment

We wish, at this point, to call your attention to the importance, on the first visit, of systematic x-ray examination of the chest in frontal and lateral projections, as well as the spine, pelvis and upper femora before one can fully determine the extent of the disease The information thus obtained may materially affect the selection of the method of treatment, since these areas are the most frequent sites for visceral or skeletal metastases, which may be present even *though the tumour is apparently localized to the* breast only

CLASSIFICATION OF CASES

Statistics can be so collected as to prove almost any point In mammary cancer any reported group of cases must be closely scrutinized in order to ensure that they have been properly sorted clinically, treated methodically and the conclusion drawn from impartial critical analysis of the results per class Steinthal's clinical classification of cancer of the breast which is based upon the apparent clinical extent of the disease only, is inadequate for an exact interpretation of the results Portmann's[1] classification seems to be the best of all since it relies not on clinical findings alone, but includes the pathological and roentgenological findings, as follows

GROUP I (stage)
- (*a*) tumour definitely localized to the breast and movable
- (*b*) skin not involved,
- (*c*) metastases not present in axillary lymph nodes,
- (*d*) no evidence of pulmonary or skeletal metastases

GROUP II (stage)
- (*a*) tumour localized to the breast and movable,
- (*b*) skin not affected (or only slightly adematous or ulcerated),
- (*c*) metastases present in axillary glands, but few involved,
- (*d*) no evidence of pulmonary or skeletal metastases

GROUP III (stage)
- (*a*) tumour diffusely involving the breast,
- (*b*) skin involved (adematous, ulcerated, multiple nodules),
- (*c*) metastases to numerous axillary glands or to other tissue (supraclavicular nodes, lungs, bones)

The cases which fall into Group III are not difficult to classify The main difficulty lies in classifying early and accurately the patients in Groups I and II This will only be possible after operation and with the histo-pathological report as to whether or not the axillary glands are involved, providing that a number of lymph nodes have been examined This should not be a deterrent, since we are quite convinced with Portmann and others that only in cases belonging to Groups I and II should operation be considered, while the Group III cases should be rated as inoperable and left to radiation therapy alone

In this communication we shall discuss (1) Treatment of primary cancer of the breast for (*a*) operable cases, those falling into Groups I and II, (*b*) inoperable, or Group III, cases (2) Treatment of local recurrence, as well as regional and distant metastases

TREATMENT OF PRIMARY CANCER OF THE BREAST

(*a*) *Operable cases Groups I and II*

METHODS OF TREATMENT

Surgical—For a good many years radical surgical removal of the cancerous breast and pectoral muscles, with careful and complete dissection of axillary glands has been generally accepted as the proper procedure in the operable case Simple mastectomy is not as commonly used as the radical, because it does not permit more than clinical opinion as to the presence or absence of metastases to the axillary nodes

Surgical treatment alone generally has left much to be desired In view of the remarkable improvement produced with radiation therapy in inoperable cancers of the breast when first submitted to this method of treatment many years ago, it was thought that perhaps irradiation alone could do the job For various reasons it has not yet done so Consequently a combination of surgery and radiation has been developed with improved results

Before discussing the value of these several methods of treatment for each clinical group, since radiation may be used preoperatively or postoperatively, a clear definition of the various combinations used is necessary for subsequent analysis

Radiation—Preoperative irradiation consists in the administration before operation of adequate therapeutic irradiation (mainly with x-rays) directly to the breast area and to the principal routes of regional extension of cancer (*i e*, to the axillary lymphatics and lymph nodes) in those cases which are considered as

potentially operable The purpose of preoperative irradiation is to destroy as many cancer cells as possible, considerably diminishing the activity of the remainder, and seal off the avenues of spread before operation In order to attain that goal it is essential to deliver a sufficiently large cancericidal dose without increasing too much the difficulty of the following operation We feel that the time interval between the completion of irradiation and operation must be such as to let the normal tissue reaction subside, that is six to eight weeks, in order that the surgeon shall have no untoward difficulty

Postoperative irradiation—This is a therapeutic method which consists in the administration as soon as possible after removal of the breast, to decisively "mop-up" such cancer cells as may remain or have escaped during the process, and hence reduce or prevent local recurrences or distant metastases When we say, "as soon as possible", we mean immediately after initial healing of the operative wound Radiation is then used to destroy and make nonviable the cancer cells which may have been left, after operation, in the breast area and draining lymphatics To produce that result, the radiologist must give adequate doses of x-rays not only to the anterior chest wall, and axilla, but also to the posterior chest wall, scapular and supra-clavicular areas, all regions where metastases commonly occur before spreading widely If the primary tumour was found in the mesial half of the breast the mediastinal retrosternal glands should also be thoroughly irradiated The so called "prophylactic dose", which never damages cancer cells, ought to be discarded X-ray doses to cure should always be given The administration of postoperative roentgen therapy should be planned for and given to every case of operable mammary cancer

There is frequently misuse of the term "postoperative irradiation" This is particularly important in the interpretation of the results of the various combinations of treatment Irradiation, given some time after operation, is not and must not be included as "postoperative", especially in those patients who were operated upon in spite of the confirmed presence of distant metastases, or in cases where local cutaneous or glandular recurrences have shown up, with strong probability of distant metastases In such cases, it does not represent a phase in the combined method of treatment, but merely the use of irradiation as a palliative measure for inoperable recurrent or disseminated cancer

Value of Various Methods of Treatment in the Operable Cases

From a practical standpoint we must consider the results obtained (1) without any treatment, (2) with radiation alone, (3) with surgery alone, (4) with surgery and postoperative irradiation, (5) with preoperative irradiation and surgery, with or without postoperative irradiation

1 *No treatment*—There have been and still are patients who have never received any treatment for their cancer of the breast Amongst them the range of survival varies from a few months to about twenty years Various authors have calculated the length of life in series of such cases The average survival period ranges between 36 and 40 months

2 *Radiation alone*—There is a lack of any consecutive series of adequately irradiated patients with operable carcinoma of the breast Few surgeons will refer cases of operable carcinoma to be treated by radiation alone as a test group Further, radiation therapy is still in a state of flux, in which only a few centres have maintained the physical characteristics of the x-radiation used at a fixed level for the past five to ten years, so rapid have been the advances in the mechanical features and potency of the equipment So far, therefore, I have been unable to find any reliable figures as to the average survival for this category of patients

3 *Surgery alone*—Statistics are abundant as to what surgery alone has done for operable cancer of the breast These vary considerably all over the world, depending upon the ability of the surgeon, and the degree of selection of operable cases

Portmann compiled and published the reports of 43 well-known surgeons on the results obtained by operation alone over a period of 20 years The five-year survival rates vary from 15 to over 50%, the average being 28% Hintz, of Berlin, in 1933, at Madrid, gave the following figures 4,952 patients treated surgically only, with a five year survival rate of 28 4%

An average survival rate of about 28% over very large series of operable cases with the best individual series at about 50%, are figures which are not high enough to permit many to boast nor to be satisfied with the end-result It is easy to understand that much hope was placed

in a combination of therapeutic measures such as surgery and irradiation to improve the results

4 *Surgery and postoperative irradiation*—As previously stated, we definitely believe that all operable cases should be given postoperative irradiation The Group I cases, in which clinically and pathologically, a complete removal of the growth apparently has been done, are not to be excluded Only a small percentage of patients with mammary carcinoma fall into this group at the time of operation, for axillary metastases are found microscopically in all but 20 to 30% of cases Group I cases treated by surgery alone have a five-year survival rate as cited in the literature varying from 75 to 90% With the addition of postoperative irradiation in many clinics, the end results have improved by 5 to 10% In the cited Group I cases, the failure to obtain close to 100% permanent cures has been due not so much to the inadequacy of treatment as to inadequate classification and inclusion of patients with distant metastases, either not looked for or impossible to disclose Very possibly it is also due to the fact that many people use Steinthal's classification, and axillary metastases are easily missed clinically with the resultant error of inclusion of Group II cases

Undoubtedly, postoperative irradiation has given the best and most obvious results in the Group II cases where axillary metastases are present In referring to that category of cases and the use of surgery followed by radiation therapy, Ewing[3] states that "anatomical cures may be *accomplished in a high* percentage of suitable cases" The end-results in our experience and according to many others have definitely improved in this group of cases with irradiation With surgery alone, the five year survival rates vary from 40 to 50% in the best surgeons' hands With immediate postoperative irradiation, the rate rises to between 60 and 75% These figures would be higher still if in this category were not included cases which, although clinically thought to be operable, were found at operation to belong to Group III, but for whom as complete removal as possible of the growth has been done, with subsequent thorough irradiation There is hope for still better results with the more adequate doses of x-radiation which we now employ But this does not give complete satisfaction with the methods employed, and it is our belief that the survival rate in operable carcinoma of the breast can be further improved by the use of

PREOPERATIVE IRRADIATION AND SURGERY, WITH OR WITHOUT POSTOPERATIVE X-RADIATION

A combination of preoperative irradiation and surgery, to the best of my knowledge, has been relatively uncommon in published series Trimble,[4] of Johns Hopkins, employs both preoperative and postoperative irradiation in all the operable cases He reports that "microscopic examinations made on breasts removed after preoperative irradition show complete destruction or disintegration of cancer cells, shrinking of the remaining nuclei and about total absence of mitotic figures"

In a series of 127 operable cases which received preoperative irradiation, Adair[1] reported that Ewing and Stewart found microscopically a total destruction of cancer cells in the primary in 33%, and in axillary gland in 22% Punch biopsy previous to irradiation had proved cancer When one considers the often dramatic improvement obtained with radiation therapy alone in the inoperable case treated in our department and elsewhere, the addition of preoperative irradition would appear to be the logical next step in the development of a regimen of treatment for carcinoma of the breast

Our personal experience with preoperative irradiation is too limited as yet to have figures to offer We hope that more cases will, in the future, be submitted for roentgen therapy before operation In our opinion the following procedure should be followed first, biopsy (punch) of tumour and axillary glands, second, adequate preoperative roentgen therapy, third, radical operation after a certain reaction period, fourth, the additional use of postoperative irradiation, to be governed by the result of the microscopic examination of the surgical specimens If there is no histological trace of viable cancer cells in the breast, or in axillary glands, no postoperative irradiation would be indicated However, if viable cancer cells are still present in either the breast or the axillary glands, or in both, additional postoperative irradiation should be used

TREATMENT OF INOPERABLE CARCINOMA OF THE BREAST

It is our deep conviction that too many advanced cases, belonging to Group III, are operated upon, which should not be Surgery in these cases is very difficult, and a complete removal of the growth is practically impossible Many cases are operated upon in spite of the

known presence of distant metastases, for which surgery is unable to do anything It is our belief that all Group III cases should be treated with irradiation alone initially, especially if extensive ulceration, sloughing, and secondary infection are also present Radiation alone does not induce local spread or distant metastases

The immediate results of irradiation in the inoperable case are surprisingly good, and the end-results will undoubtedly be better than with combined surgery Five-year survivals will not run any higher than 10 to 15% in those advanced cases Patients will survive longer and with greater comfort for the major portion of the time, without surgery

Some of the cases in Group III are made apparently operable, although we strongly question the advisability of operating on any such case which was primarily inoperable

In that type of carcinoma called inflammatory, and occurring frequently amongst the younger group of females, surgery is not practicable and radiation therapy has little to offer even in palliation

Treatment of Recurrences and Metastases

Irradiation is the method of choice for the majority of recurrences or metastases We occasionally advise excision of a single suspected skin metastasis, largely to confirm our diagnosis But the five-year survivals after the treatment of those metastases will be very few, if any Cutaneous recurrences in the operative scar or cancerous lymphangitis of the pectoral area along an œdematous arm may be controlled for some time with roentgen therapy if the lesions are widespread, or with radium if they are not too extensive

We can say that in this group (III) survival will rarely be longer than one to two years, because widespread distant metastases have already occurred or will develop in those cases This is particularly true in patients with multiple skin recurrences or cutaneous metastases

Metastases to the lymph nodes of the axilla, supraclavicular space or other glandular areas can be controlled to a considerable degree with radon seeds or x-radiation Surgical dissection, in our opinion, is unwise

Skeletal metastases respond surprisingly well to x-radiation In our experience 65% have considerable relief from pain lasting for months with doses of 3,000 to 4,000 r, 33% are not only relieved of this pain but also show radiographic evidence of cessation of progression of skeletal metastases with regeneration of almost normal bone tissue, 25% of the cases get little or no benefit at all from irradiation However, we wish to emphasize that those cases should not be abandoned because they presumably are hopeless Some have survived as long as three years in relative comfort most of the time In a series of 24 cases that we have investigated, the average survival is 14 months

Pleuro-pulmonary metastases may be improved temporarily with roentgen therapy, with relief from pain and subsidence of effusion, and with resultant comfort The ultimate prognosis is poor, of course, but pulmonary metastases, due to hæmatogenous spread, seem to do slightly better than the others and may survive for a year or more

In the treatment of any type of cancer the family physician, the attending surgeon, and the radiologist should keep in mind the question "What will afford the patient the greatest relative comfort for the longest period of time?"

Summary

1 The necessity of a complete history and thorough clinical examination, with roentgenologic studies, before decision as to the method of treatment for a case of carcinoma of the breast has been emphasized

2 Portmann's classification of cases is more accurate and exact than that of Steinthal, and should be more widely used

3 As regards the treatment of the primary tumour, all (Groups I, II and III) cases should be treated with irradiation All operable patients (Groups I and II) should be given preoperative irradiation followed in 6 to 8 weeks by radical mastectomy This would seem to be the most logical step to improve survival rates still further Postoperative roentgen therapy ought to be administered if viable cancer cells should be found microscopically in the surgical specimen

4 The Group III cases (inoperable) should be treated with irradiation only in a very high proportion of cases Some may subsequently appear to be operable, but surgical measures with them should be used with extreme discretion

5 Local recurrences and distant metastases, especially those involving the skeleton, respond relatively well, at least temporarily, to radiation therapy No matter what the outlook is, it is

ver so hopeless as it may seem Even if a ure is not possible, one often can afford the patient relief and palliation of pain, at least emporarily, and sometimes skeletal repair uch measures will contribute to strengthen confidence and maintain morale until the inevitable end

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RESUME

Le traitement d un cancer du sein exige un examen clinique attentif comprenant des radiographies pre operatoires Tous les malades (groupes I, II, et III Portman) doivent subir l'irradiation de la tumeur primitive Les malades operables (groupes I et II) doivent etre irradies avant l operation radicale qui aura lieu 6 a 8 semaines plus tard Si l'examen histologique decele des cellules cancereuses la radiotherapie post operatoire s'impose Les cancers inoperables seront traites par la seule radiotherapie Les recidives locales et les metastases osseuses ou pulmonaires repondent assez longtemps a la radiotherapie Les cas desesperes en profiteront plus qu on ne l a cru des bienfaits de la roentgentherapie, la plupart du temps, ces malades souffrent moins et parfois il s'effectue in situ des regenerations insoupconnees JEAN SAUCIER

CASTRATION FOR CARCINOMA OF THE PROSTATE

A Report on Fifteen Treated Cases

By Emerson Smith, M D , F.A C S , F R C S (C) and John T MacLean, M D

Department of Urology, Royal Victoria Hospital, Montreal

RECENT advancement in the treatment of cancer of the prostate has given to patients with this disease a comfort and improved outlook on life undreamed of two years ago

Carcinoma of the prostate affects 5% of all men who reach the age of 60 years One out of every five prostate glands removed for benign hyperplasia shows carcinoma histologically The pessimistic prognosis in these cases was well founded up until two years ago when Huggins[1] [2] startled the medical world by stating that in his experience bilateral castration alone caused patients with carcinoma of the prostate to improve greatly in their general health, often caused the primary tumour to become smaller, and in many instances the metastases to regress His clinical work was preceded by careful experimental work on dogs The basis for this remarkable change is intimately bound up with endocrinology, as will be described later in this report

Our experience in the Royal Victoria Hospital, Montreal, with 15 patients who have been castrated for carcinoma of the prostate confirms Huggins' major premise that the patient's general health is remarkably improved, but so far we have been unable to demonstrate any great change roentgenologically in the metastatic lesions However, in only one of our cases has a year elapsed since operation, six months has elapsed since operation in 7 cases, and the remaining 7 have been done within the past six months Our series is too small and inadequate for the purpose of drawing final conclusions although it does indicate the general trend

In our series the average age was 72 years and the range in ages from 58 to 88 years All had far advanced carcinoma of the prostate on rectal examination A biopsy was done on 12 of these, and all 12 were positive for carcinoma of the prostate On the remaining 3 a biopsy was not done It has now become our practice to insist upon a biopsy in all cases, in order to evaluate accurately our results and avoid errors in diagnosis All 15 patients had extensive roentgenological examinations for metastatic lesions Seven of the 15 had definite metastatic lesions in the bony pelvis, lumbar spine, or long bones, and one had questionable metastases It must be remembered however that metastatic lesions may be present in the spine or long bones months before they are demonstrable roentgenologically

Treatment—Fourteen of the 15 patients were admitted to the hospital because of symptoms of prostatic obstruction, and of these 3 were admitted because of acute retention In one patient carcinoma of the prostate was a coincidental finding, the patient being admitted for repair of bilateral inguinal hernia One of the patients admitted with symptoms of prostatic obstruction had had a two stage suprapubic prostatic enucleation done in another hospital 4 weeks before coming to us At that time a diagnosis of carcinoma of the prostate had not been made On rectal examination the prostatic bed tissue was present but small An irregular

* This paper was written in October, 1942, and since that time our total number of cases has reached 15 Similar results have been obtained in this larger series

hard mass extending upwards was found fixed to the rectum Biopsy showed carcinoma solidum Six patients had a two stage suprapubic prostatic enucleation In one of these the castration was done 5 years after the prostatectomy, in the second it was done one month after prostatectomy, and in the third it was done at the time of primary drainage In the remaining three who had had a suprapubic prostatectomy, a transurethral prostatic resection had to be carried out at a later date because of recurrent symptoms of prostatic obstruction Orchidectomy was done in these 3 cases a few days after the transurethral resection One patient had a permanent suprapubic cystotomy done 3 months before orchidectomy Seven patients had transurethral resections for relief of obstructive symptoms without any other prostatic surgery Four of these had only one resection and the remaining three had two, three, and four resections respectively Three of these patients had in addition to the transurethral resection deep roentgen-ray therapy, in two it was given before the castration Two patients had castration alone without any prostatic surgery

There was one death in the group, a patient 66 years of age who had his first transurethral resection in January 1940, and three more subsequently The tissue removed at resection showed histologically adenocarcinoma on the first three resections, and a squamous cell carcinoma on the fourth resection in October 1941 He was re-admitted to the hospital on January 2, 1942, complaining of a narrow urinary stream, frequency and hæmaturia as well as pain over the sacrum An orchidectomy was done on January 12, 1942 There was no improvement postoperatively He was discharged, and re-admitted March 8, 1942, at which time a large tumour was found in the bladder On March 23, 1942, a suprapubic cystostomy was done and fulguration of the bladder tumour carried out His condition became progressively worse and he died At autopsy he was found to have a large squamous cell carcinoma of the bladder which was secondary to carcinoma of the prostate

In the remaining 14 patients with prostatic cancer surgical castration gave spectacular relief In all but one the pain disappeared within 48 hours Patients showed a great improvement in appetite, and over a period of three months all gained weight, the amount varying from 15 to 30 pounds, and their strength returned The most remarkable changes were seen in those patients who had been absolutely crippled with pain or even bedridden Within 48 hours they were up walking about without assistance One of these cripples, whose roentgenograms showed extensive metastases in the spine and pelvis is now playing golf

It is not claimed that surgical castration is a cure for carcinoma of the prostate It does, however, relieve pain in the majority of cases and gives the patient a new lease on life In some cases there is regression of the primary growth In two of our cases with symptoms of prostatic obstruction the symptoms entirely disappeared following castration without any prostatic surgery whatsoever Huggins[13 14] stated and Dean and his co-workers[6] have since stated that marked regression or entire disappearance of the metastatic lesions occurs in many cases We have not been able to confirm these findings The roentgenograms in our group fail to show regression of the metastatic lesions, and in one case there is definite progress of the lesion However, the group is too small from which to draw final conclusions, and in four cases made quate time has elapsed since orchidectomy for changes to occur Dr Carleton B Peirce Radiologist-in-Chief of the Royal Victoria Hospital, has recently reviewed roentgenograms of the series done in some other centres He has kindly prepared the following statement for us

"The possible palliation to be afforded by orchidectomy in carcinoma of the prostate presents a hopeful move in the treatment of this neoplasm The response, so far as our experience goes, and in the material which I have seen from other centres, is not uniform, either clinically or in the x ray changes There would appear to be a group of patients in which no major effect is induced in the metastatic lesions, at least radiologically This, however, should not be taken as a major contra indication, but rather as a lead for further investigation as to cause"

The following are illustrative case reports from our series

CASE 1

Aged 64 years Admitted with decreasing urinary stream 3 months' duration, nocturia and frequency 1 month, loss of 20 lbs weight in 1 month Rectal examination showed a prostate enlarged 2 to 3 times the normal size on the left, consisting of a broad hard ridge running upwards and outwards This was fixed to the surrounding tissue Bilateral orchidectomy was done 8 days after admission and he was discharged on the eighth postoperative day, voiding normally A biopsy was not done Roentgenograms showed metastases to the sacrum at this time Three months later, the patient was entirely asymptomatic and feeling generally greatly improved Roentgenograms showed a marked extension of the bony metastases since the last

Five months postoperatively he had gained in strength and weight Rectal examination time decrease in the size of the prostatic mass

CASE 2

65 years This patient had had a two stage ic prostatic enucleation one month prior to ad on our service He complained of burning and e discomfort since his operation Rectal ex showed the presence of some prostatic bed *d, superior and continuous with this, an irregu* mass extending upwards The mass was not epididymitis was present on the left side An omy was done on the left side the day after and a transurethral resection was done two ter The pathological report on the prostatic moved was carcinoma solidum The patient was d from the hospital 10 days postoperatively admitted 5 weeks later complaining of hemn difficulty in starting the urinary stream, nce discharge from the hospital, and low back e right side of three days' duration Rectal on showed a large hard fixed mass Roent es of the pelvis and long bones did not show nce of metastases An orchidectomy was then the right side He was discharged 2 weeks after ation, feeling greatly improved generally, free rin, voiding much more freely, and without on

CASE 3

2 years Admitted April 5, 1942, complaining n of 5 years' duration, difficulty in starting rry stream for 18 months, and acute retention ays He had in addition pain in the lumbo gion of 3 months' duration He was able to a few steps at a time and was in great dis so that he *spent most of his time in bed* Rectal tion showed a markedly enlarged hard, flat, fixed prostate Roentgenograms showed exten tastases in the 1st, 2nd, 3rd, and 4th lumbar , the sacrum and the right innominate bone pubic cystotomy and bilateral orchidectomy was ril 11, 1942 Two days postoperatively he was free of pain, and feeling better generally than or months The second stage of the prostatec s done April 25 By May 15 he was completely uprapubically, but he still had some difficulty in A transurethral prostatic resection was done thological report was adenocarcinoma of the He was discharged from the hospital 10 days During the next six weeks he gained 20 pounds ht It is this patient formerly bedridden, who ying golf in June He has remained entirely ce then (8 months) and walks to his office daily

HE SIGNIFICANCE OF THE ACID SERUM HOSPHATASE IN PROSTATIC CARCINOMA

hosphatase is an enzyme which splits phosphorus compounds to give free ate ions Phosphatases differ in the pH a h they show their maximum activity, ordingly are known as acid or alkaline atases

1935 Kutscher and Wolbergs[16] discovered rmal human prostatic tissue is extremely n "acid" phosphatase The Gutmans[17] shed the fact that the prostate is the only that is rich in "acid" phosphatase The ntration in adult human prostatic tissue to 2,500 units of activity per gram fresh as compared with less than 5 units of activity at pH 4.9 for kidney, liver, duodenal mucosa and bone[18] The enzyme normally is excreted in the prostatic component of the ejaculate Its exact function is unknown (MacLeod[17] has shown that the motility of spermatozoa depends largely on the glycolytic cycle, and the Gutmans believe the "acid" phosphatase may play a part in this cycle) However, in prostatic carcinoma, when the capsule of the gland ceases to be intact, and the growth infiltrates into the surrounding soft tissues or metastasizes to bone, the "acid" phosphatase now enters the blood stream[19] We use the King and Armstrong[14] method of determining the "alkaline" phosphatase, and a modification of this method for determining the "acid" phosphatase By this technique normal individuals show a range of "alkaline" phosphatase from 3 to 15 units, and the "acid" phosphatase is below 3 units per 100 c c of serum

Determinations of the "acid" and "alkaline" phosphatase were carried out on 13 of the 15 patients We have not as many determinations as we would desire for statistical work

The effect of castration on the serum "acid" and "alkaline" phosphatase levels in these 15 patients with prostatic carcinoma is shown in Table I

In our series values of "acid" serum phosphatase above 6 units per 100 c c were found to be pathognomonic of metastasizing prostatic carcinoma This confirms the experience of Dean and collaborators[6] In 130 cases of prostatic carcinoma with metastases studied by Sullivan, Gutman and Gutman,[19] "acid" serum phosphatase was elevated in 85% The acid-serum phosphatase may not however reach these higher levels, even when metastases are proved to be present It has been suggested by the above workers[19] that this may be due to a low "acid" phosphatase activity of the tumour tissue itself

When the secretory stimulus of the androgens is removed by castration, there is a rapid fall in the "acid" serum phosphatase by 45% within 48 hours, 73% within 2 weeks, followed by a transient gradual rise, and, finally, a prolonged decline until after 2 or 3 months equilibrium is reached[19] In those patients who do particularly well clinically, the "acid" serum phosphatase remains at these new lower levels[19] Huggins and Hodges attribute a persistently high postoperative "acid" phosphatase to stimulation from androgens from extragonadal

sources The prognostic significance of such persistent postoperative elevations is not yet clear [19]

The Significance of the Alkaline Serum Phosphatase in Prostatic Carcinoma

It should be realized at the start that there is no correlation between the "acid" serum phosphatase and the "alkaline" serum phosphatase in patients with metastasizing prostatic carcinoma In our series of 15 patients the preoperative and postoperative levels of "alkaline" serum phosphatase are also shown in Table I Dean[6] believes "the activity of the bone defense is indicated by the amount of "alkaline" phosphatase in the blood" After castration the early changes are not consistent, but after a latent period of 2 to 3 weeks there is a rise of the "alkaline" phosphatase attributable to the osteoblastic activity in the healing of skeletal metastases As the extra bone formation finally declines the serum "alkaline" phosphatase level falls off to normal [6]

Endocrinological Considerations

Huggins showed in his original work that the administration of androgens (male hormones) made patients with prostatic carcinoma worse while treatment with œstrogens reduced the activity of the prostatic epithelium and made the condition of the patients with prostatic cancers better The amount of androgens present in the urine can be determined by measuring the 17-ketosteroids in the urine, using either the method of Callow[3 4] or one of its modifications The term "17-ketosteroid" simply denotes a steroid with a ketone group attached to the 17th carbon atom Testosterone itself is not a 17-ketosteroid, but during the process of metabolism is broken down into 17-ketosteroids The two known sources in the body of 17-ketosteroids are the male gonad and the adrenal cortex [8]

Table I

The Effect of Castration on Serum "Acid" and "Alkaline" Phosphatase Levels in 15 Patients with Prostatic Carcinoma

Case No	*Roentgenographic evidence of metastases	Biopsy	Preoperative phosphatase		Interval postoperative	Postoperative phosphatase	
			Acid	Alkaline		Acid	Alkaline
10	xxx	Adeno-Ca	1 8				
11	0	Adeno-Ca	1 1	11 6	15 days	8 0	6 4
12	0	Adeno-Ca	6 0	85 4			
7	xxx	Adeno-Ca	6 7		4 days	6 2	
9	0	Adeno-Ca	3 4	9 6	5 days	2 8	
4	xxxx	Adeno-Ca			2 days		84 5
					4 days	8 5	80 6
					60 days	9 2	
8	xx	Adeno-Ca	17 5				
2	†	Adeno-Ca			5 days	4 3	14 3
		Squamous cell Ca					
15	x	Adeno-Ca	33 3	34 6	7 days	5 7	47 6
					35 days	3 0	19 1
3	0	Ca Solidum			60 days		5 0
					90 days	2 9	11 4
5	*0*	*Ca Solidum*	*4 8*	*1 0*	*11 days*	*2 3*	*7 0*
14	0	Ca Solidum					
13	0	No biopsy	5 8				
1	xx	No biopsy			90 days	4 8	36 0
6	xx	No biopsy	2 5	13 1	10 days	1 7	6 7

Explanation of Table I

*Roentgenographic evidence of metastases

0—No metastases
†—Doubtful whether metastases are present or not
x—Metastases present, small amount
xx—Metastases present, large amount
xxx—Metastases present, marked amount
xxxx—Very large number of metastases present, diffuse

†*Adeno-Carcinoma, Squamous Cell Carcinoma*

In this patient, the first three biopsies taken over an eighteen month period showed adeno-carcinoma The fourth and subsequent biopsies showed squamous cell carcinoma At autopsy, a squamous cell carcinoma of the bladder secondary to carcinoma of the prostate was found

one would therefore anticipate a drop in the 17-ketosteroids in the urine following surgical castration, since the adrenal gland would be the only remaining source of 17-ketosteroids. This expected drop of androgens in the urine was found in 9 cases out of the 10 studies by Satterthwaite, Hill and Packard[18] in whom the urinary androgens were measured before and after castration.

However it should be pointed out that as Forbes[9] has shown, immediately after any non-specific damage, for example operation, there is *in the first 24 hours a rise, and subsequently a* fall of 17-ketosteroids, which returns to normal as the patient recovers. Thus the decrease in *17-ketosteroids immediately after castration may* be due not only to the removal of the testes, but also to the non specific effect of operation on the adrenal function, and a rise might be expected as the patient recovers from the operation. This non-specific fall of 17-ketosteroids has been confirmed by Browne and Schenker[2].

It has been shown[6] that the administration of stilbœstrol, either orally or intramuscularly, will produce a marked decrease in the urinary excretion of 17 ketosteroids. This is the same effect as is produced in the majority of cases by surgical castration. It should be pointed out again that this effect may also be one of non-specific damage.

Clinically, Chute, Willetts, and Gens[5] found that the results when stilbœstrol alone was used were the equal of those when castration and stilbœstrol were used, although the beneficial effects last only as long as administration of the drug *is continued*.

In centres where stilbœstrol is frequently used in lieu of castration, it is not an uncommon experience that because of the unpleasant side effects of stilbœstrol, the patient will return in a few months' time and request that castration be done.

In the patients admitted to the Royal Victoria Hospital with carcinoma of the prostate we do a surgical castration whenever possible. If improvement is not maintained we then institute stilbœstrol therapy. The dose of stilbœstrol given is 5 mgm. per day orally for 2 weeks, then 5 mgm. twice a week thereafter. The occasional unpleasant side effects of stilbœstrol *therapy are* nausea, anorexia, tenderness and hypertrophy of the nipples, swelling of the breasts, and transitory peripheral œdema[5]. None of these symptoms are in any way serious, and will *usually* disappear by reducing the dose of stilbœstrol. We have had to give stilbœstrol to only one case in this series.

Surgical Technique

In the past we have done an orchidectomy in the usual manner by dividing the cord and removing the whole scrotal contents. Local anæsthesia of 1% novocain is used in the skin, the spermatic cord is exposed and then freely infiltrated with 1% novocain, giving complete anæsthesia of the testicle, except perhaps in the region of the attachment of the gubernaculum. The gubernaculum is infiltrated if necessary. For the past three months we have been using the technique described by Chute, Willetts, and Gens[5] of an intracapsular orchidectomy. To quote directly from them the technique is as follows:

> "After the testis has been exposed surgically a generous incision is made in the tunica albuginea, and the soft stringy, tan coloured testicular substance is ligated in order to allow the completion of the removal. After this is done the incision in the tunica is sutured together again. In this way the functioning substance of the testis is removed, but there remains the spermatic cord, the epididymis and the oval mass formed by the sutured tunica albuginea. The patient is not left with an empty scrotum as in the case following the usual type of orchidectomy."

One can readily gain the consent of the patient by asking permission to remove "part of the testicle", (when using this technique) as opposed to the difficulty encountered in gaining consent when the patient feels he is losing the whole testicle as in the other types of operation.

Summary and Conclusions

1. Surgical castration in patients with carcinoma of the prostate gives spectacular improvement in the majority of cases. There is frequently complete relief of pain within 48 hours, a marked improvement in appetite, a *gain in weight*, and an increase in the red blood cell count. It is not claimed that castration is a cure for carcinoma of the prostate.

2. The primary tumour may decrease in size. In two of the patients with symptoms of prostatic obstruction castration alone was done, without any prostatic surgery. The symptoms of obstruction in these two patients entirely disappeared.

3. We have been unable to confirm the statement that the metastatic lesions may entirely disappear.

4 Intracapsular orchidectomy has many advantages over the other types of orchidectomy, and it is much easier to gain consent to do this type of operation

5 In our experience an increased "acid" serum phosphatase is considered pathognomonic of metastasizing carcinoma of the prostate

6 In some cases it is possible to predict by the elevated "acid" serum phosphatase, metastatic carcinomatous lesions before they are demonstrable roentgenologically

7 We believe that if the original pronounced improvement seen after castration is not maintained, the patient should be placed on stilbœstrol therapy Stilbœstrol therapy was required in only one patient in our series

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RÉSUMÉ

Dans la plupart des cas de cancer de la prostate, la castration chirurgicale a donne des resultats excellents les douleurs diminuent et parfois disparaissent, l'appétit et le poids augmentent, le taux des hématies se relève. La tumeur primitive peut diminuer de volume, mais on ne peut affirmer sa disparition complète L'operation n'est pas une cure radicale mais elle est le meilleur palliatif connu a ce jour La testiculectomie intracapsulaire est plus simple et doit être la methode de choix L'augmentation de la phosphatase acide du serum sanguin serait pathognomonique de l'évolution métastatique du cancer de la prostate, et parfois, permettrait le pronostic avant l'evidence radiologique Lorsque la castration ne se maintient pas apres castration, le stilbœstrol est utilisé avec avantage JEAN S

FAILURES IN INGUINAL HERNIA

By Roy Anderson, M D, F R C S (C)

Lecturer in Clinical Surgery, University of Alberta, Edmonton

IN present day language the word "failure" suggests defeatism That is not intended in my subject title In the language of less recent date a realistic study is what is aimed at in the consideration of our series of cases But, paradoxically enough, the motive of the study rather savours of idealism, or, if you wish, common sense

Because, when a situation exists in medical practice that is bad, we, as a profession, do not accept it as unalterable and final Rather, we analyze the situation as it exists and we then proceed to correct it

Gibbon, one of England's greatest historians, was prematurely lost to civilization because of the failure of an operative procedure for a hernia and hydrocele The operation was done by Mr Cline, one of England's greatest surgeons and tutor to Sir Astley Cooper That was in 1794 In 1804, Sir Astley Cooper produced his book, "The Anatomy and Surgical Treatment of Hernia"

From those dates to the present the story of inguinal hernia has been told some hundreds of times, but throughout those years there has run a discordant theme of partial failure At times

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that melancholy theme has been almost displaced by a more happy one of success but, on the whole, as in Sibelius's "Finlandia", there persists that dismal strain of frequent postoperative recurrences

At our University Hospital in Edmonton 750 cases of inguinal hernia have been reviewed in detail They constitute all the inguinal hernias operated on in the hospital between 1923 and May 1942, inclusive, the follow-up being carried out only up to June, 1941

On patients admitted to our hospital for the first time for hernia repair 828 operations were carried out Among these, 21 secondary operations were performed later for recurrences, making a total of 849 operations A total of 102 of these 849 procedures were done for recurrent hernias, 21 our own and the balance from other places Of the 102 recurrences 50 were indirect when the secondary operation was done, evidence against the belief once held that practically all recurrences are direct

In the attempted follow-up in the series, 319, or 42 5%, were heard from or examined Fifty-six among those heard from or examined developed a recurrence following operation Assuming that there was the same ratio of recurrences among those we did not hear from as among those we did hear from, the recurrence rate following all the 828 original operations performed is 16%

To picture the failures somewhat graphically, if the 800 doctors and their wives at this convention were to have operations for our hernias, 16% of us, or 128, would have recurrences That is all the doctors here from Alberta would have recurrences (if done in Edmonton), which of course would be disturbing Incidentally, this recurrence rate is no higher than that given by a number of careful investigators, both on the American continent and in England

The average age of all patients was 39 years, the average age of those with direct hernias was 48 years and of those with indirect 38 years

TABLE I

Approximately	*Exact %*
Of every 6 25 hernias repaired 1 was a failure	16
Of every 7 hernias repaired 1 was *for a previous failure*	14
Of every 8 hernias repaired 1 was of the direct variety	15
Of every 70 hernias repaired 1 was of the sliding variety	1 4

Of every 6 25 hernias repaired one was a failure and one of every 7 hernias repaired had been a previous failure Of every 8 hernias repaired one was of the direct variety and one of every 70 hernias repaired was of the sliding variety (Table I)

As indicated by the foregoing figures, when we take on the responsibility of repairing a hernia, we should bear in mind that there is one chance out of 6 25 that it will recur, that there is one chance out of every 8 that the hernia is of the direct variety and one chance out of 70 that it is of the sliding variety All of which should impress us with the fact that our responsibility in dealing with hernia should not be considered as lightly as it has been our wont to do, and that the permanent repair of a hernia is not a simple, routine procedure

Where recorded, silk was used in 193 cases and catgut in 512 cases Again, where recorded, there was a wound discharge, varying from simple serum to free pus, 3 times following silk sutures and 16 times following catgut No relationship of recurrence to type of suture used and to discharge in the wound postoperatively was apparent

Does our review reveal any possible causes of this large number of failures? What are the recurrence rates following our various techniques? (Table II)

The "sac only" technique shows one of the lowest recurrence rates Obviously, this should be so since the operation is done only in those cases where a congenital, indirect sac exists, the hernia of not long standing, the internal oblique muscle complete and well developed and the posterior wall of the canal firm and strong

As a matter of comparison we reviewed 319 cases of a similar type in which "sac only" was used, these including only indirect hernias and those of the same age group in which "sac only" technique was done, but in which the "Bassini" technique was carried out The recurrence rate here was 10 7% The suggestion is therefore strong that in suitable cases "sac only" technique is superior to the "Bassini" procedure

There were no recurrences in our follow-ups of the 8 "fascia lata flap" operations, 7 of which were for recurrent hernias The number is too small upon which to base definite conclusions, but it does suggest that this "flap" procedure is a good one for repairing even recurrent hernias It is probably definitely established now that the hernial sac should not be used as a patch, but, even though this was done twice, no recurrence was reported, although

TABLE II
OPERATIVE TECHNIQUE

	Total operations	Operations for recurrence	Primary recurrence (in follow ups)	Secondary recurrence	Estimated total recurrence in %
Cord superficial	44	10	2	3	26 3
Sac only	76	0	1	0	3 1
Fascia lata flaps 6 Hernial sac used as patch and turner 2	8	7	0	0	0
Living transplant sutures	20	17	1	4	55 0
Cord buried	89	13	6	2	21 6
Bassini Simple Bassini 425 +McArthur 4 +Rectus flap 7 +Stump suspended 4 +Ox fascia 9	449	17	19	5	13 3
Imbrication Simple imbrication 75 +Ox fascia 3 +Superficial 4 +Zimmerman 6 +W-A stitch 35 +Cord buried 9 +Transversalis fascia 2 +McArthur 2 +Cord superficial at mid point 1	137	25	5	8	22 4
Repair of transversalis fascia Simple transversalis fascia 5 +Bassini 12 +Rectus flap 5 +Cord buried 1 +Zimmerman 2	25				
Not recorded	1				

probably because of the fact that a Turner flap was used as well

The 4 or 5 techniques that show the highest recurrence rates are the "living transplant suture", "cord superficial", the various "imbrication" methods, "cord buried", and the "Bassinis", with various modifications Obviously, the cases in which these were done, especially with the "imbrication" methods, were more difficult problems than some of the others But the figures at least do suggest strongly that these methods are not adequate With the technique described as "transversalis fascia" plus added procedures we have had no recurrences However, these have been done more recently and the follow-up is therefore not long enough, and the number is too small upon which to reach any conclusion

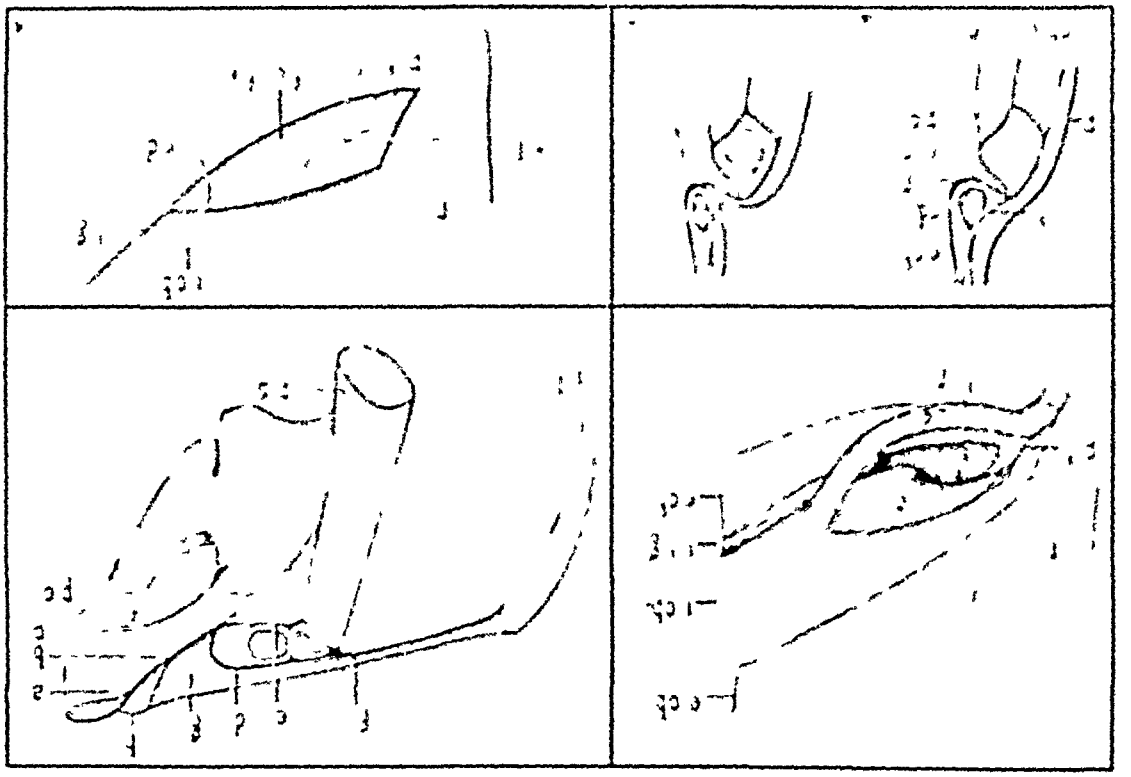
ANATOMY

When a surgical problem becomes knotty it is often helpful to go back and look afresh at the anatomy and physiology involved

Dr H E Rawlinson of the anatomy department, University of Alberta, kindly dissected and reviewed for us the inguinal region in a number of anatomical specimens Then, working directly from the dissected specimens, he outlined diagrammatic sketches of the region which are shown in the following figures

Fig 1—It is now pretty well accepted that *the external oblique plays little or no part in* the etiology of hernia The same applies to the external ring During the Great War men were rejected from the United States army if large external rings were present, even if a sac could not be demonstrated In the present war draftees are accepted regardless of the size of the external ring and are rejected or operated upon only when a hernial sac can be definitely demonstrated

Before the cord is displaced downwards, the internal oblique, with the closely associated transversus abdominis muscle and transversalis fascia fill the entire area above the cord and form behind the cord a common sheet called the "posterior wall fascia" In cases in which direct hernia is likely to develop, there is a lack of muscle in the area above the cord, and the transversalis fascia becomes not only the first line of defense but the only line of defense The transversalis fascia in this region is strengthened by aponeurotic bands which pass into it from the two flat muscles, a fact which has recently been stressed by Anson and McVay [13] In fact, they say the transversalis fascia is really the aponeurosis of the transversus muscle The line of attachment of the transversalis fascia (or transversus aponeurosis) is shown in Fig 2 Medial to the point marked *a* on the pubes the fascia splits to form the rectus sheath Immediately lateral to this point the insertion is to the pubes, and lateral to this is carried on to the ramus of the pubes to join in an attachment common to it and the lacunar ligament, and both are carried still further laterally on the ilio-pectineal line as the ligament of Cooper When the femoral canal and vessels are reached, the transversalis aponeurosis curves in front of



internal oblique muscle and its aponeurosis, and behind it strong, unstretched transversus aponeurosis or transversalis fascia, all that is required is removal of the sac

In long-standing indirect hernias, with moderately large internal rings but the internal oblique muscle in good condition and pretty well filling the posterior wall triangle, more is called for than simple removal of the sac A tightening of the internal ring must be carried out and can be done by a few interrupted fine sutures which infold and tighten the transversalis fascia immediately inferior and medial to the internal ring The transversalis fascia (or aponeurosis) immediately above the lacunar and Cooper's ligament also must be tightened and strengthened and sutured down to its insertion along the iliopectineal line All such cases, postoperatively, should be instructed to build up and consistently maintain good abdominal muscle tone

In all old, indirect hernias with large internal rings and weak posterior walls, and in all direct hernias and probably in all recurrent hernias, the posterior wall triangle must be considered a triangular hole in the abdominal wall In such cases it is always a hole of respectable size, and a hole of considerable size in any structure, whether it be an inner tube of a tire, an outer tube, a hole in a dyke, or the heel of a sock, cannot be repaired by simply pulling and dragging the sides together There will always be a break out The defect must be repaired by something which fills in the defect—a plug, a darn or a patch

In the case of hernias and tires, there is a first line of defense, the transversalis fascia and the inner tube, respectively We do not fasten the edge of the hole in the inner tube to the outer casing, no more should we fasten the edge of the transversalis fascia to the outer casing, the external oblique (Poupart's ligament), but rather to its own structure and insertion—Cooper's ligament

Having repaired the first line of defense, we build up the hole in the outer defense by a darn or a patch For many reasons the patch is preferable, the patch, either pedicled or free, depending upon the size of the defect to be repaired It can be taken from fascia of the rectus or from fascia of the thigh and occasionally from the aponeurosis of the external oblique, depending upon the indications present in each individual case

Just as the repair of a hole in the outer defense of a modern harbour would have to be carried out by the application of basic modern engineering principles, so in the use of our hernial patch repair, fundamental well established surgical principles must be applied meticulously and intelligently

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RÉSUMÉ

Sur 625 cas de hernie il est probable qu'un malade (ou 16%) récidivera et les statistiques prouvent que sur 7 cas opérés, l'un d'eux (ou 14%) aura déjà subi la cure chirurgicale La suppuration semble plus fréquente après l'emploi du catgut qu'après celui de la soie Dans certains cas, la technique du "sac seulement" est supérieure au procédé de Bassini L'opération utilisant un lambeau du *Fascia lata* paraît bonne Les techniques qui sont le plus souvent suivies de récidive sont la *"living transplant suture"*, le cordon superficiel, les diverses méthodes d'imbrication, le cordon enfoui et les *Bassini* Les récidives sont négligeables à la suite de la technique dite du fascia du transverse Tout le problème consiste à réparer correctement le triangle de la paroi postérieure Parfois il faudra rétrécir l'anneau interne, parfois resserrer le fascia du transverse, ailleurs, il faudra refaire la paroi postérieure avec du fascia pris à un droit de l'abdomen ou à un muscle de la cuisse JEAN SAUCIER

G S Barrett, C H Rammelkamp and J Worcester (*Am J Dis Child*, 1942, **63** 41) record two cases of *meningitis due to B coli*, in a girl aged 6 years and a boy aged 2 weeks, who recovered under treatment with sulfanilamide and its derivatives This form of meningitis is commonest in infants under 3 months of age, and without chemotherapy is fatal in about 80% The portal of entry may be obscure, but associated infections of the middle ear, urinary tract, and umbilicus may be present Bacteriamia has been found in a number of cases The course may be protracted, with relapses and the occurrence of hydrocephalus Whole blood transfusions in infants under 2 years may aid in the treatment —Abs in *Brit M J*

Fig 1—X ray of chest before operation Fig 2—X ray of chest after operation Fig 3—Microphotograph of representative high power field stained by hæmotoxylin and eosin

same gross characteristics On section there were white and yellowish bands of fibres of varying width coursing through the gelatinous background in irregular whorls Sections were fixed in formalin and stained with hæmatoxylin and eosin, by Bielkowsky's method for neurofibrils and by Spielmeyer's method for myelin Frozen sections were also stained by Scharlach R and Nile blue sulphate for fats

Microscopic sections—In the hæmatoxylin and eosin stain the striking feature was the presence of ganglion cells arranged irregularly in clusters of varying size The surrounding and intervening tissue which formed the bulk of the structure was composed of fine fibres in small and large clusters and seemingly separated by unstained spaces These aggregated fibres unravelled and re bunched themselves in erratic and formless patterns like a snarled skein of wool, the relative number of single and clumped fibres varying in different parts of the tumour No myelin was demonstrable for the Spielmeyer stain, but rare ganglion cells showed black granules The Bielkowsky stain illustrated beautifully that the clear spaces in the hæmatoxylin and eosin stain were a tracery of neurofibrils from the most delicate to those of coarser consistency The histology of the tubular stalk attached to the capsule was that of a nerve while the surface boss was composed of nerve fibres and ganglion cells as in the tumour, but in more orderly arrangement No fat was demonstrated in the frozen sections stained with Scharlach R and Nile blue sulphate (see Fig 3)

Pathological diagnosis—Ganglioneuroma (Chest tumour registry No 90,100, ganglioneuroma)

COMMENT

The majority of ganglioneuromas are found accidentally on routine examination of the chest by x-ray, as in this case Others have manifested themselves by mediastinal pressure, as evidenced by pain, Horner's syndrome, or bronchial obstruction (dyspnœa, cough or hoarseness) Unlike the more or less closely related tumours of the carotid bodies and adrenals (paraganglioma, chromaffin cell tumour or pheochromocytoma) they never manifest any endocrine changes

Clinically, a ganglioneuroma can be distinguished from the so called "superior pulmonary sulcus tumour", the epidermoid carcinoma of branchial cleft origin described by Pancoast[5,6,7] Although this neoplasm at times causes a Horner's syndrome it seldom shows the other points of the Hare or Pancoast syndrome, the pain and atrophy of the arm from pressure on the brachial plexus nor the rib erosion seen in the latter And again the smooth round x-ray shadow of a ganglioneuroma shows a marked contrast to the irregular infiltrating shadow of a Pancoast tumour On the other hand this smooth shadow cannot be distinguished from a cyst, however the posterior position shown in the lateral x-ray is at least suggestive of neurogenic origin Prior to operation a ganglioneuroma cannot be distinguished from other neurogenic tumours, especially from a neurofibroma or a neuroblastoma, but apparently the age-period is of some help Many of the reported ganglioneuromas have been discovered in childhood, whereas the neuroblastomas often make themselves manifested in infancy and most of the neurofibromas reported have not been found until adult life

Since the classification of these tumours has been recently reviewed by James and Curtis[1] we shall summarize only sufficiently to show the relative position of the ganglioneuromas amongst intrathoracic neurogenic tumours

Practically all of the neurogenic tumours found in the thorax are considered to arise from the primitive undifferentiated migrating pluripotential sympathicoblasts (sympathogonia[8]) According to Bailey and Cushing[9] these primitive sympathogonia give rise to three kinds of cells, the neuroblasts, the pheochromoblasts, and the astroblasts From these three in turn corresponding benign tumours may arise ganglioneuroma, pheochromocytoma (paraganglioma of the carotid body, and chromaffin cell tumour of the adrenal medulla, etc) and neurinoma (Schwannoma) If the parent cells are completely undifferentiated a malignant sympathicoblastoma occurs, or if partially differentiated, a less malignant neuroblastoma is the result

A number of the benign intrathoracic tumours have been reported as neurofibromas Theoretically at least, this is a composite group *Some of these arise from the neurolemma or* sheath of Schwann (neurinomas or Schwannomas) and are therefore derivatives of the primitive ganglionic crest According to Andrus' classification other so-called neurofibromas are derived from perineurial or endoneurial fibrous tissue, and are therefore mesenchymal in origin rather than neurogenic The latter may show nerve fibres from a concomitant overgrowth

Between these benign tumours, the ganglioneuroma the neurinoma (Schwannoma) and the perineurial fibroma (neurofibroma) on the one hand, and the partially differentiated neuroblastoma, the completely undifferentiated sympathicoblastoma and the sarcoma on the other hand, there would appear to be cases showing characteristics of both groups The line between benign and malignant cases is far from definite On histological examination some specimens have shown both mature areas and immature areas, benign tumours have been known to undergo malignant change and finally in at least one case a malignant sympathicoblastoma after removal recurred as a benign ganglioneuroma [12]

For these reasons alone early removal is essential X-ray therapy has no influence on the mature adult benign group *and only a transitory* effect on a few of the less differentiated malignant types [13] The most important consideration in treatment is removal as early as possible after discovery even if there are no symptoms

SUMMARY

1 The successful removal of an intrathoracic ganglioneuroma is reported in detail

2 *The clinical features and x-ray diagnosis* are discussed

3 The pathological diagnosis and the relation to other neurogenic mediastinal tumours are briefly reviewed

4 Immediate removal is indicated because of the uncertainty of the pathological diagnosis until after histological examination

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THE DIAGNOSIS OF CHRONIC RIGHT HEART STRAIN SECONDARY TO PULMONARY DISEASE*

By Allan S Kennedy, M B, F A C P

Hamilton, Ont

DURING the years 1930 to 1942 the author had the privilege of studying the problem of chronic cor pulmonale in the cardiac practice seen in a large sanatorium where patients with tuberculosis and other chronic pulmonary conditions were available for observation

In estimating the degree of strain thrown on the right heart by pulmonary disease, for any given case the objective sought was the diagnosis of right ventricular hypertrophy As individual case reports including autopsy findings were listed, one came to appreciate the apparent difficulty in diagnosing relatively slight degrees of right ventricular hypertrophy

* A paper presented before the joint meeting of the Canadian Tuberculosis Association and the Ontario Laennec Society June 6, 1942

VENTRICULAR MEASUREMENTS

Patients at autopsy by measurement of right and left ventricle walls as well as by heart weight were found to have hypertrophy of the right ventricle, while serial x-rays as well as 6 7-foot plates of the chest on the same patients showed no evidence of either right heart enlargement or total enlargement Orthodiagrams also failed to foretell the appreciable right heart enlargement found at autopsy In contradistinction to the left ventricle, the right ventricle, because of its lesser total bulk and because of its anterior position, can increase its size appreciably before such an increase is detectable by x-ray of the chest White[1] discusses the difficulty in diagnosing right ventricle hypertrophy

Our case reports showed that hypertrophied right ventricle could occur after four or five years of chronic pulmonary tuberculosis with some associated emphysema However, certain other cases, fewer in number, showed no hypertrophy of the right ventricle after 15 to 20 years of pulmonary tuberculosis and associated emphysema

X-rays of the chest are by no means accurate in disclosing the diffuse extent of involvement of the lung capillaries and smaller arterioles, the partial or complete obliteration of which is the main requisite for the setting up of hypertension in the lesser circulation

DIAGNOSIS OF RIGHT HEART STRAIN

For many of the patients studied an attempt was made by practical application as well as by a review of the literature to evaluate the following possible means of aiding in the diagnosis of right heart strain (1) circulation-time estimations, (2) auscultation of the heart, (3) blood pressure estimations, (4) electrocardiography

The use of various tests to measure circulation time from arm to lung, arm to tongue, and lung to tongue, is not of value in diagnosing right heart strain, unless there is failure or impending failure of the right ventricle The tests used in our cases were injections of ether and saccharine given intravenously at the bend of the elbow These tests gave no help in diagnosing right ventricular hypertrophy[2]

Pulmonary disease, by setting up a state of hypertension of the lesser circulation, leads to accentuation of the second heart sound over the pulmonary area Sometimes there is reduplication of the second pulmonic sound as well as accentuation

The importance of changes heard in the second basal heart sound has often been underestimated clinically in chronic chest lesions, for two reasons First, the audibility of heart sounds is so much depressed by considerable emphysema that an accentuation of sound is easily missed Second, in many chests with chronic lung lesions the heart may be slightly shifted to the right, so that any accentuation of the pulmonic sound is masked by the increased audibility of the aortic second sound It has been my experience[3] that in the vast majority of cases studied, whether the heart be shifted to right or left, any case with a chronic lung lesion which showed a constant reduplication of an accentuated second basal heart sound on either side of the sternum had a hypertrophied right ventricle The only exceptions to this rule that I have met have been a few cases showing systemic hypertension or calcification of the aortic valves

Inspiratory fall in systolic blood pressure may be found in people with extensive chronic lung lesions These cases show chronic pulmonary emphysema either alone or associated with some other lung disease The lung condition probably causes enough disturbance of lung elasticity interfering with the normal mechanical filling and emptying of the heart to imply some degree of right heart strain When present in cases of chronic pulmonary disease, with or without pneumothorax, this blood pressure phenomenon nearly always is associated with hypertrophy of the right ventricle[4 5 6]

ELECTROCARDIOGRAPHY

Electrocardiography, properly utilized, is the most accurate method of estimating slight degrees of right ventricle hypertrophy when the electrocardiograms are studied together with a record of the basal heart sounds, blood pressure determinations and fluoroscopic view

In the investigation carried out one naturally sought to relate varying degrees of right axis deviation in the electrocardiogram to the presence of right ventricular hypertrophy in the individual presenting such axis deviation It was soon obvious that definite right axis deviation (R A D) could be associated with a right ventricle which appeared to be normal at post mortem, and also that electrocardiograms of normal axis deviation were obtained in persons

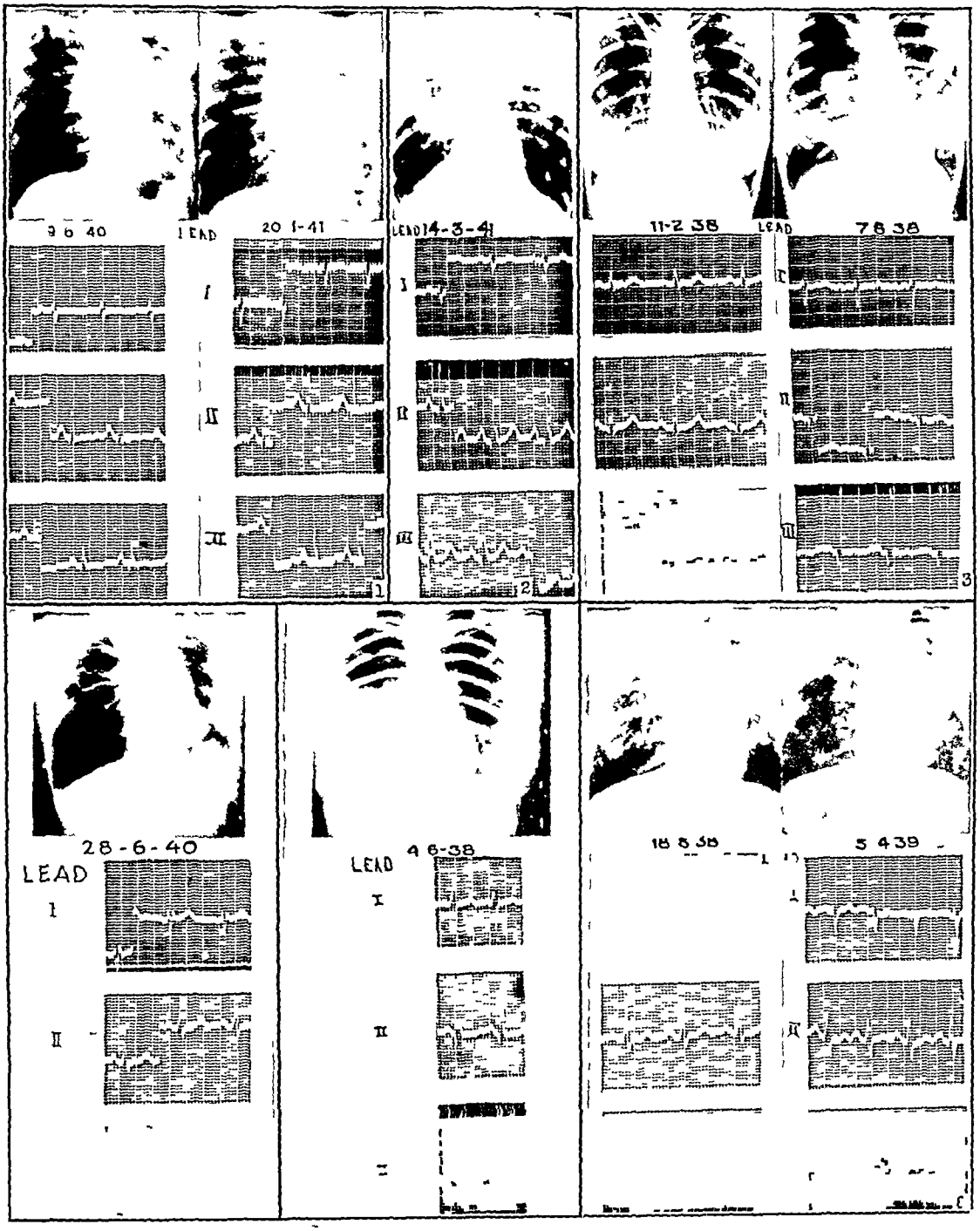

Fig 1 (H A)—Male aged 15 years Chronic pulmonary lesion includes tuberculosis bronchitis and emphysema Supine position In the interval the heart has been rotated more to the left in both axes Electrocardiographic findings can be explained on basis of cardiac position Autopsy (1 9 41) showed no hypertrophy of either ventricle Fig 2 (R B)—Male aged 30 years Recumbent position Relatively short history of pulmonary tuberculosis Position of heart cannot explain the electrocardiogram Autopsy (1-9 41) showed dilatation of both ventricles with moderate hypertrophy of both but chiefly involving the right ventricle Heart weight 365 grm Measurement of ventricular walls was 0 6 cm for the right and 1 6 cm for the left Fig 3 (G C)—Female aged 21 years Recumbent position Right sided pneumothorax has rotated the heart to the left in the longitudinal axis chiefly In a vertical heart the degree of rotation in the longitudinal axis determines the type of axis deviation in the electrocardiogram Fig 4 (C S)—Male aged 40 years Supine position Extensive chronic pulmonary tuberculosis plus emphysema R A D could be due entirely to cardiac position Evidence of right heart strain was found on auscultation of heart sounds and by blood pressure determinations Patient in December 1942 still being hospitalized Fig 5 (A R)—Female aged 28 years Supine position
right has produced rotation
in both axes No previous
R A D caused by position
Male aged 41 years Position supine Autopsy (4 9 39) Heart weight 422 grm Right ventricle wall was 1 0 cm thick with moderate dilatation Left ventricle wall was 1 2 cm thick with very little dilatation Pulmonary tuberculosis and silicosis Type of cardiac rotation could account for first tracing but with no significant change in cardiac position the second electrocardiograph indicates right heart strain

who had definitely hypertrophied right ventricles Again, very slight degrees of R A D were associated with hypertrophy of the right ventricle in other cases

Obviously, two factors at least had to be considered in an attempt to explain the above discrepancies between the electrocardiographic findings, and the presence or absence of right ventricle hypertrophy

Right ventricular enlargement might exist but because of associated left ventricular hypertrophy, the resultant electrocardiogram could show normal axis deviation Lewis,[7] as early as 1913, refers to this point and several authors since then have discussed effects of changes of heart position [8 to 17]

About the year 1935, it seemed obvious as the study of individual cases was continued that there was a truly remarkable discrepancy between, on the one hand a considerable number of references in the literature concerned with axis deviation, and on the other hand the lack in actual practice among chronic chest patients of any real plan of diagnosing moderate degrees of right ventricle hypertrophy

INVESTIGATION OF TUBERCULOUS PATIENTS

During the two-year period 1935 to 1937, a group of 60 adult patients with pulmonary tuberculosis each had x-rays taken of the chest, fluoroscopic study of the heart, and an electrocardiogram just prior to the initiation of unilateral pneumothorax Then, for each patient a repetition of the above methods of investigation was done at three to eight weeks' interval following the initial pneumothorax All the several forms of examination were done on the same day for each patient At periods of approximately three months following this second series of observations the same procedures were carried out for each patient for one to two years

Naturally, many other patients over the previous ten years had the same type of repeat examinations, six months to three years after a first set of observations of the same type In the interim for this larger group, there had occurred, due to scar tissue retraction, pneumothorax, atelectasis, institution of contralateral pneumothorax, a shift or rotation of the heart to varying degree During the years 1935 to 1942, 80 autopsies were performed on patients who had received an adequate series of observations as outlined above Only by following this plan of investigation was it possible to appreciate in a practical way the changes produced in the electrocardiogram by position changes in the contour of the heart Nearly all the electrocardiograms were taken in the supine position A few cases done in the sitting position at the first investigation had their repeat tracings in the same position [17]

The electrical axis was determined in terms of an index by the formula quoted by Carter [18] It was considered that normal right-axis deviation lay in the zone of minus 10 to minus 15, and normal left-axis deviation (L A D), plus 20 to plus 30 At this point it is well to point out that in the investigation presented here the degree of axis deviation was not considered important A change in the position contour of the heart can in a few weeks change an electrocardiogram from normal to a right-axis deviation of minus 26, in our series On the other hand in chronic pulmonary disease in an adult, when we are sure there is no shift or rotation of the heart, the finding at the first examination of a supposedly normal degree of right-axis deviation will in most instances mean hypertrophy of the right ventricle

When a large number of chronic lung patients, with or without pneumothorax, are studied the types of changed heart position contours seen can be classified as follows in relation to axis deviation A few hearts will be rotated only in the longitudinal axis with no appreciable shift to right or left in the antero posterior axis In these cases a slight rotation to the left will produce some degree of right-axis deviation Rotation to the right will not so regularly produce a tendency to left-axis deviation In a few cases, hearts may be found shifted to left or right in the antero-posterior axis without any evidence of rotation in the longitudinal axis This is the type of case which is usually referred to as illustrating the effect of heart position on electrocardiographic findings This type of shift to the left tends to produce L A D and similarly shift to the right tends to cause changes indicating R A D in the electrocardiogram In most instances where there is altered heart position, the change is usually a combined one of shift to right or left in the antero posterior axis combined with rotation in the same direction in the longitudinal axis

Theoretically, from the above, and from the literature these two types of rotation antero posterior vs longitudinal tend to nullify each other It has been possible only by studying

many case reports to appreciate that where the heart is to the left in both axes, the longitudinal rotation is always the predominant one in influencing axis deviation

Similarly, but to a less predictable extent, a shift of the heart to the right in the anteroposterior axis tending to thereby cause R A D in the electrocardiogram may show a coincident rotation to the right in the longitudinal axis, thereby causing the axis deviation of the electrocardiogram to be normal or toward L A D A shift of the heart as a whole to right or left, will not cause any axis deviation changes

For the purposes of this investigation normal heart weight was considered to be 300 grams or less The normal thickness of the ventricle walls was defined as 1 4 to 1 5 cm for the left ventricle, and 0 4 to 0 5 cm for the right ventricle In relating heart weight and ventricle wall thickness in terms of cardiac hypertrophy it was necessary to appreciate the degree of cardiac dilatation which might be present Obviously, a heart can be hypertrophied and weigh considerably more than 300 grams, yet if marked cardiac dilatation exists, ventricle wall measurements might be very little if any over the figures quoted above which we decided upon as our normal limits

Apart from the question of right-heart strain secondary to pulmonary disease, none of the type cases presented in this paper had any organic heart lesion All the patients studied were over 16 years of age No electrocardiogram was included in the series if there was abnormal Q R S interval or if the voltage in the standard leads was not over 5 millivolts

At the present time lead IV F, is included in our electrocardiographic studies During the years 1935 to 1938 the praecordial lead used in our investigations was taken according to the older procedure in which the various deflections of the electrocardiogram were not directed in the same direction as in the standard limb leads

The cases shown above are presented to indicate the importance of considering cardiac contour before interpreting the significance of right axis deviation in the electrocardiogram

CONCLUSIONS

1 In patients having chronic pulmonary disease the existence of right ventricular hypertrophy should be determined before such hypertrophy becomes obvious by orthodiagrams

2 The duration of a chronic lung lesion before hypertrophy of the right ventricle occurs, varies greatly in different patients

3 The interpretation of right-heart strain by electrocardiography should be considered in the light of cardiac position

4 In many cases the diagnosis of right ventricular hypertrophy is greatly aided by proper blood pressure observations and by auscultation of heart sounds

I wish to thank Captain Viola Rae, R C A M C, former pathologist at the Mountain Sanatorium, Hamilton, for the autopsy studies incorporated in this paper

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RESUME

Chez les malades atteints de pneumopathies chroniques il est important de deceler l'hypertrophie du ventricule droit de façon precoce avant qu'elle ne devienne manifeste au trace electrocardiographique Ce temps de latence eventuel peut être assez prolongé car un malade peut souffrir longtemps d'une lesion pulmonaire avant que ne se manifeste l'hypertrophie du cœur droit De toutes les methodes diagnostiques de cet etat, l'électrocardiographie est la meilleure Dans l'interpretation des traces on, devra faire cas de la position du cœur, de l'angle de rotation, etc Chez plusieurs malades les donnees de l'electrocardiographie seront supplementees par l'etude de la tension arterielle et par les donnees de l'auscultation JEAN SAUCIER

BLACK EYE CAMOUFLAGED BY NEW PREPARATION —A quick, easy method to camouflage that black eye is offered by Dr H Goodman of New York (*Pennsylvania Medical Journal*, June) He prescribes a preparation of bismuth subnitrate suitably coloured with carmine and calamine to match your skin Soap and water cleaning of the discoloured area, a layer of glycerin, then the powder —*Science News Letter*, August 28, 1943

THE BRENNER TUMOUR OF THE OVARY

By J Ernest Ayre, M D and P J Kearns, M D

Montreal

THE Brenner tumour of the ovary is at present one of the rarest ovarian neoplasms Brenner[1] is credited with its first description in 1907, when he named it the "oophoroma folliculare", believing it to be an ovular tumour In 1936 Neiman[8] referred to it as a benign fibro epithelioma of the ovary The tumour is a relatively new pathological entity, only 22 cases appearing in the literature up to 1932, when Robert Meyer[6] pointed out its distinction from the granulosa cell tumour In the Budapest Clinic over a period of 15 years von Szathmary collected 5 cases from 1,114 ovarian tumours The Mayo Clinic found 10 cases during a 30 year period At the Women's Pavilion, Royal Victoria Hospital, Montreal 3 cases have been found in the past 5 years By 1940 Novak[9] found 130 cases recorded, and by March, 1942, Fox[5] stated that a total of 170 cases were reported, to which 3 cases of our own may now be added One of these will be described in some detail

A clinical diagnosis of a Brenner tumour is seldom, if ever, made The larger tumours are grossly indistinguishable from a cystoma or fibroma, while the smaller ones are only an incidental finding The final diagnosis in all cases depends upon the microscopic examination Most cases occur in late middle life, the majority following the menopause Most authors are of the opinion that there is no associated demonstrable endocrine disorder Dockerty and MacCarty[3] reported a case showing the presence of a large corpus luteum in association with the tumour, which indicates that ovarian function was not affected sufficiently to prevent ovulation In cases of granulosa cell tumour, occurring in the child-bearing period, temporary sterility is the rule The fact that this is not true of the Brenner tumour points to a different origin of the two types of neoplasm Not infrequently, Brenner's tumour has been recorded in association with normal pregnancy Indeed, one case was reported in which the tumour obstructed labour

Schiffman reports finding uterine bleeding and endometrial hyperplasia which he attributed to a Brenner tumour Most authorities are agreed, however, that the tumour has no endocrine effect, and uterine bleeding, if present, is attributable to other causes The tumour is most frequently found in association with other pelvic disease, such as ovarian cysts, uterine fibroids, or endometriosis This would necessarily be true, as most oophorectomies are performed for other reasons than the rare diagnosis of a Brenner tumour This fact suggests the probability that Brenner tumours may occur much more frequently than appears evident, occurring as a latent condition producing no symptoms, and, so, never reaching the operating table No cases have been reported in a child But ovarian operations on children are an extreme rarity, and also the growth of a Brenner tumour is known to be very slow Therefore, its likelihood of growing to a size large enough to be diagnosed in a child is quite remote

Two types of Brenner tumours are described, the solid and the cystic The solid tumours are usually of moderate size, although there is great variability While they may be microscopic in size, one weighing 15 pounds was reported in 1936 by Neiman[8] The gross appearance is similar to that of an ovarian fibroma, being greyish-white, and in the solid variety it is dense and hard, composed essentially of epithelial strands in a fibrous groundwork The cystic tumours are sometimes quite large, with a solid mass of varying size at the hilum in which, on microscopic examination, the typical cell nests of the Brenner tumour may be found

Some authorities have contended that the tumour was almost always unilateral (Dockerty and MacCarty[3]) However Fox[5] pointed out that this statement was untenable, since in more than 50% of the reported cases the opposite ovary was either not mentioned, or, microscopic examination was not made When both ovaries were studied he found bilateral tumours in 3 of his 4 cases

Microscopically, the characteristic feature of these tumours is the presence of an epithelial cell nest surrounded by a variable zone of condensed fibromatous stroma Scattered through the cell nest central areas of cystic degeneration are found, the resulting open spaces being occupied by mucoid material or by pseudomucin, or they may be filled by large nondescript cells The epithelial cells are large,

* From the Department of Obstetrics and Gynecology, Women's Pavilion, Royal Victoria Hospital, McGill University, Montreal

Fig 1.—Fibrous nodule containing Brenner tumour. Note more primitive undifferentiated epithelium in peripheral convoluted zone, while the central zone exhibits more mature epithelium resembling squamous tissue. Fig 2.—Showing location at junction of cortex and hilum. The surrounding zone of condensed fibrous stroma is well marked. To the left at the Brenner nodule note vestigial structure resembling mesonephric tubule. Fig 3.—Brenner tumour (high power) showing clearly defined primitive epithelium peripherally, while the central zone exhibits large polyhedral squamous like cells. Ovum like structures are thought to be cystic spaces, each containing a large clear staining cell

polyhedral, and surprisingly uniform, with clear-staining cytoplasm and relatively small ovoid nuclei Usually there are no signs suggesting proliferation, and rarely are mitoses seen A curious feature is that, while the epithelial cells usually resemble squamous cells, the particular cells surrounding the larger cystic cavities, or at least some of them, exhibit a cuboidal or columnar appearance with basal nuclei and clear cytoplasm Thus, they resemble the columnar cells which line the pseudomucinous cystadenomata

Novak and Jones[9] agree with Meyer[6] that pseudomucinous and, less commonly, serous cystadenomata may originate from the cystic variety of Brenner tumour, while ovarian fibromata may arise from the solid type If this be true it seems probable that many Brenner tumours have been missed through failure to examine thoroughly the solid portions of large pseudomucinous cystomata and ovarian fibromata

HISTOGENESIS

While the Brenner tumours were originally classified amongst malignant tumours there is no case of metastasis or recurrence on record, and it is now considered to be of a slow-growing, definitely benign character Perhaps the most interesting phase of study of the Brenner tumour is in the histogenesis, which is still somewhat obscure Brenner's original concept of its follicular origin has been abandoned, and Meyer's theory, though still unproved, is at present entertained by most authors It is his belief that the cœlomic epithelium with its unusual potentiality for abnormal differentiation gives rise in embryonal development to small groups of cells within the ovarian cortex which have been termed "Walthard cell-nests" These indifferent cell complexes, sometimes accompanied by mucous epithelial cysts, were found by Walthard in the ovaries of the newborn and in young children They were also found under the serosa of the tubes and mesosalpinx Muller reports finding these rests in 12% of 251 adnexa examined, so that the Walthard rest would appear to be much more frequent than the Brenner tumour Depending upon a stimulus which is as yet unknown (possibly hormonal and nutritional) these special cell foci within the ovary may develop in various directions If they retain their indifferent character they may give rise to the solid Brenner tumour If the differentiation tends more in the direction of cyst formation the cystic tumour type may predominate Meyer contends that the Brenner tumour belongs genetically in the series including the majority of serous and pseudomucinous cystomata, the papillary cystadenomata, and the adenofibromata

The various points of similarity between the Walthard rest and the Brenner tumour probably account for the incrimination of the former as the precursor of the latter Solid and cystic forms of both are described with central degeneration But the Walthard rest lacks the peripheral fibromatous tendency characteristic of the Brenner tumour

The chief objection to this theory of the evolution of the Brenner tumour is that the tumours have never been observed in the tube, where the rests are commonest However, it must be remembered that though the tube is highly susceptible to certain infections, of all the pelvic organs it is the most indifferent to tumour growths Conversely, the ovary is relatively immune to many infections, yet subject to tumour growth

The opinion of Fischel[4] and others is that most of the ovarian components including the medullary tubules, the granulosa, and even the epoophoron tubules, are derivatives *in situ* of the mesenchyme If Wolffian tubules are included in the ovarian hilum, they possess the potentiality to form epithelium, like that which normally characterizes the urinary tract Schiller compares the epithelial variations in Brenner tumours, including even the pseudomucinous changes so often seen, with those to be found in the urinary tract One of us, (P J K) points out the resemblance of the epithelium found in the urethra and urinary bladder, etc, to that seen in Brenner tumours He suggests that this favours a common mesonephric origin of these tissues Plaut[10] holds that it is more probable that epithelial proliferation and transformation (metaplasia) of the peritoneal lining may result in the formation of these cell nests

CASE REPORT

In the case presented only the pertinent findings are given The patient was a 51 year old Russian Jewess who had been under the personal care and observation of Professor T R Fraser for several years She had been married for 30 years, and had borne two children, now aged 29 and 27 years respectively The family history was negative for cancer For the past 8 years the patient had suffered from abdominal discomfort, menometrorrhagia and dysmenorrhœa In 1940 a curettage was performed

for bleeding, and a diagnosis of chronic pelvic inflammatory disease associated with uterine fibroids was made The endometrium was found to be polypoidal and hyperplastic, with inflammatory changes

On admission to the Women's Pavilion of the Royal Victoria Hospital on May 30, 1942, she complained of an exacerbation of abdominal pain and uterine bleeding The findings on examination suggested a possible degeneration of a fibroid with enlarged diseased adnexa At operation a left sided ovarian cystoma with chocolate cysts was found in a pelvis choked with adhesions The uterus was enlarged, containing several small intramural fibroids, and both tubes and the appendix were involved in an exudative inflammatory condition A subtotal hysterectomy bilateral salpingo oophorectomy and appendectomy were performed

On gross examination of the removed organs the degree of multiple pathological lesions found was a striking feature The uterus was moderately enlarged and contained several fibromyomata The left ovary contained an orange sized chocolate cyst, measuring 14 cm in diameter, while the right ovary was only slightly enlarged and contained several small chocolate cysts One part of the cortex was nodular in character Both tubes were thickened, soft and hæmorrhagic, the right quite adherent to the appendix and ovary

Microscopically, the organs showed ovarian endometriosis with bilateral chocolate cysts, multiple fibromyomata uteri, bilateral salpingitis in an exudative and productive stage, and fibrinous appendicitis with the appendiceal lumen containing a hæmorrhagic and purulent exudate The endometrium was atrophic The nodular thickening in the right ovary proved to be a Brenner tumour (Fig 1), exhibiting several unusual features Its small size and therefore the absence of any pressure atrophy produced an unusually delicate and clear histological picture The nodule was embedded partly in cortical tissue and partly in the medulla, and was in close proximity to a vestigial structure which resembled a mesonephric tubule (Fig 2) Enclosed within an encircling fibromatous ring of connective tissue were found two different types of tissue The first appeared as islands of undifferentiated immature epithelial cells after the fashion of a convoluted pattern In some parts these cells were clustered together more closely, exhibiting a deeper staining character The other tissue consisted of nests of more mature squamous like epithelial cells containing a few microscopic cystic cavities Curiously, each of these cavities contained a single large cell lending a distinct appearance of an ovum One can readily understand from this picture (Fig 3) how Brenner mistook this cellular arrangement for an "oophoroma folliculare"

The cells of the epithelial nests appeared to be large and polyhedral with an abundant clear staining cytoplasm, and a large uniformly oval or round pale staining nucleus The nuclei contained deeper staining nucleoli and fine chromatin particles Some of the smaller epithelial nests appeared in the centre of the more primitive indifferent cell clusters The appearance of the tumour cells throughout was that of benignancy, and no evidences of mitoses were found

As we have mentioned previously menorrhagia has not been the rule with Brenner tumours While bleeding was a prominent clinical feature of our case it seems highly improbable that the tumour was the cause The presence of endometriosis, pelvic inflammatory disease, and several small intramural fibroids provide a superfluity of causes to account for the uterine bleeding

While the presence of a mesonephric-appearing structure in close association with the Brenner tumour arouses speculation, it is our opinion that it is insufficient evidence to link the two histogenetically The tumour portrays a new histological feature in the finding of primitive undifferentiated epithelium in the peripheral convoluted zone, while the central zone exhibits more mature epithelium resembling squamous tissue This may prove a further step towards revealing the true origin of this unusual tumour

SUMMARY

The Brenner tumour is a rare ovarian neoplasm It is a relatively new disease, less than 180 cases having been described in the literature to date, nine-tenths of these since 1932 Clinically it may resemble a solid or cystic ovarian tumour if large enough to be felt Otherwise, it is merely a coincidental finding associated with other pelvic disease In contrast with the granulosa cell tumour, there appears to be no demonstrable endocrine disturbance

While the histogenesis of this tumour has not been proved as yet, Meyer's theory that it arises from a Walthard rest is most generally accepted

In the case here presented the histological pattern portrays ovum-like structures in the cystic cavities, so reminiscent of Brenner's original description of the arrangement as an "oophoroma folliculare" The most striking feature of the case is the finding of epithelial cells in the nest which would appear to represent two different stages of maturity, the undifferentiated pavement epithelium peripherally and the more mature squamous like epithelium centrally

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DISSECTING ANEURYSMS

By Lorne Shapiro, M D, C M

Montreal

A DISSECTING aneurysm may be defined as the lesion produced by penetration of the circulating blood into the substance of the wall of a vessel, with subsequent extension of the effused blood for a varying distance between the layers In most cases the aorta is involved, though dissecting aneurysms can form in the pulmonary artery and in all grades of arteries down to the small perforating arteries of the brain The sac communicates with the original lumen through a rupture, or ruptures of the inner layers of the wall, and though in a few cases it remains as a hæmatoma it more usually ruptures either to the exterior or back into the lumen In the latter event, the original symptoms may disappear and the patient recover, with an additional endothelial lined channel through which the blood circulates Exceptionally the sac becomes completely obliterated

In the 16th and 17th centuries, a number of authors described cases of rupture of the aorta with local dissection of the coats, but they did not seem to appreciate the real nature of the occurrence, to them, it was the initial event in the formation of saccular aneurysm As an example, Nicholls in 1761, published his "Observations concerning the body of his late majesty" George II, in which he says "in the trunk of the aorta, we found a transverse fissure on its inner side, about an inch and a half long, through which some blood had recently passed, under its external coat, and formed an elevated ecchymosis This appearance showed the true state of an incipient aneurysm of the aorta"

Maunoir in 1802 was the first to clearly suggest dissection of the arterial coats by blood The first to actually use the term "dissecting aneurysm" was Laennec, he used it in 1826, but as if it were an already accepted term Elliotson in 1830, gives a clear description of dissecting aneurysm Pennock, 1839, was the first to demonstrate that the dissection takes place between the laminæ of the media

Peacock, at the middle of the 19th century collected a large series of cases and also did work on the cadaver to prove that dissection took place along the media He blamed disease of the media, possibly rheumatism, as the cause During the latter half of the century, there was a great deal of theorizing on the causation, particularly the mechanical factors involved, and also the histological changes in the media Such men as Bostrom, Adami, Flockemann, von Recklinghausen, Thoma, Schede, etc, dealt with the subject The basic principles of the subject were well established, or at least suggested, a century ago Sherman makes a thorough analysis of the subject in his valuable monograph, and several other authors in recent years have contributed their findings in series of cases Most of the newer work has brought out the importance of idiopathic medionecrosis of the aorta as a predisposing condition for rupture and dissection

It has been realized of late that this condition may occasionally be recognized clinically, and though little can be done in the way of treatment, it is important to differentiate it from coronary occlusion for prognostic reasons Glendy, Castelman and White[6] presented an interesting paper in which the clinical aspect is stressed, and features of the differential diagnosis pointed out

The present report deals with a series of 7 cases examined at autopsy in the Pathological Department of the Montreal General Hospital from 1925 to 1941

These occurred in a total of 5,380 autopsies for the period, which is a ratio of 1 in every 768 autopsies This is fairly well in accord with the incidence found in other series

CASE 1

(Autopsy No 26 111) A man, aged 57, with a history of inadequately treated syphilis and chronic pulmonary tuberculosis developed a lung abscess following pneumonia, in April, 1926 The patient was up and about the house on June 18th, feeling quite well On June 19, he felt pain in the right upper abdomen, which radiated to the right flank There were spasms of dyspnœa and coughing, and distress about the heart Blood pressure 142/76 A pleuro pericardial friction was audible Death occurred on July 1

Autopsy—The pericardial sac was filled with massive blood clot The heart was greatly enlarged, weighing 550 grm There was thickening of the cusps of the mitral and aortic valves Just above the aortic valve was a sclerosed mass, and above this a ruptured area which admitted the finger Microscopically, the aorta showed considerable atheroma, and some small round cell invasion of the intima and adventitia

Comment—This case illustrates the most common site of primary rupture in the ascending aorta, with external rupture into the pericardium The extent of the dissection was not described The possible rôle of syphilis and tuberculosis in damaging the aorta is to be considered, no degeneration of the media was noted

* From the Department of Pathology, the Montreal General Hospital

CASE 2

(Autopsy No 37 89) An unidentified woman who died suddenly after being sick with "bronchitis" Autopsy disclosed a dissecting aneurysm of the first part of the aorta with rupture into the pericardium The aorta showed marked atherosclerosis Microscopic sections showed a split in the outer third of the media filled with blood clot, marked atheromatosis of the intima, and slight degeneration of the media, a loss of muscle and collagenous connective tissue

Comment—The site of the aneurysm is again the usual one, the split occurred characteristically in the media, and slight degeneration of this coat was found

CASE 3

(Autopsy No 37 193) A man, aged 59, was playing ball with his sons one evening, when he experienced a sudden severe pain in the right scapular region This occurred about 7 o clock He was taken to the out patients' department at once The pain was now present in the right hypochondrium, as well as the scapular region Blood pressure 160/85 Morphine failed to give relief About 11 o clock he cried out, saying that something had broken in his back, and complained of pain in the lower back His colour was ashen, and he was covered with perspiration The right lung field was *dull to percussion Death occurred at 11 46 p m*

Autopsy—A large extrapleural hæmorrhage of the right chest, displacing the lung forward and inward, was found A transverse slit through the intima and media of the aorta was located 2 cm distal to the opening of the left subclavian artery The wall was split upwards for 1½ inches, and downwards for 2 inches The heart was not enlarged, and the coronary arteries were not diseased The aorta showed marked arteriosclerotic changes, a plaque lay at the anterior edge of the slit The histological findings were dissection of the inner third of the media, slight round cell perivascular infiltration of the media, and degenerative changes in the media, including fatty infiltration

Comment—The clinical and pathological findings are readily correlated Primary rupture produced the first severe pain, limited dissection in the ensuing hours was associated with steady uncontrollable pain, and the final *event of rupture into the extrapleural space produced* the subjective sensation 'of breaking of the back" It may be noted that the blood pressure remained high Rupture in the region of the isthmus of the aorta is the second common site

CASE 4

(Autopsy No 40 98) A man, aged 62, who had been attending the medical out door for six years, was known to have arteriosclerotic heart disease with shortness of breath and pain in the chest There were a number of admissions to the ward for episodes of congestive failure The highest blood pressure recorded was 155/100, the heart was found to be enlarged 11 cm to the left of the midline In December, 1939, the final admission to hospital, he complained of precordial pain on respiration and palpitation There was also frequency, pyuria, and hæmaturia In January, 1940, there were several episodes of hæmoptysis, and groups of petechiæ appeared in the skin In May, pressure sores developed, and one became infected Blood urea began to rise, and he died in coma

The pathological diagnoses were bilateral suppurative pyelonephritis, gangrenous pyelitis and ureteritis, patchy gangrenous cystitis, chronic suppurative prostatitis, moderate arteriosclerosis of the aorta, coronary sclerosis, a large white thrombotic vegetation on the tricuspid valve, passive congestion of lungs and abdominal viscera, old pulmonary tuberculosis, and "healed" dissecting aneurysm of the aorta

The aorta was double barrelled in the descending portion, the false channel lying posterior to the aorta, and separated from it by a common wall It did not surround the aorta The primary rupture lay just distal to the left subclavian artery, a button hole like slit with rolled edges, opening into the false channel This channel extended down to the level of the renal arteries where there was a re entrance rupture into the lumen The lining of the aneurysm was smooth, and showed atheromatous like degeneration One intercostal artery crossed the false channel, appearing as a cord

Histological study showed marked medial degeneration, there is muscle atrophy with crowding of the elastic lamellæ and in some areas sharp interruptions in the elastica Sections of the aneurysmal wall showed an inner layer of fibrous tissue with elastic fibrils a middle layer composed of 4 to 8 elastic lamellæ from the original media, and an outer thickened layer of dense layers of collagen

Fig 1 (Case 7)—Primary rupture in ascending aorta Fig 2 (Case 4) — "Healed" dissecting aneurysm of the descending aorta and vegetative endocarditis of the tricuspid valve

Comment—The clinical history does not point to any definite episode when the actual rupture and dissection occurred Secondary rupture back into the lumen prevented an immediately fatal result, and allowed the formation of an edothelium lined channel through which circulation took place, though re entrance to the lumen does not always obviate external rupture "Healed" dissecting aneurysms are compatible with many years of life

CASE 5

(Autopsy No 40 256) This case concerns a sailor, aged 46, who developed symptoms of peptic ulcer in February, 1939 In April, 1939, following severe burns of the legs, he vomited blood About the same time, he had precordial pain and palpitation with signs of congestive failure He was able to return to work until February, 1940, when there was a severe hæmatemesis He was admitted to the Montreal General Hospital again in September, 1940, with signs of auricular flutter and heart failure The blood pressure was 184/128 The heart was enlarged to the left, 14 5 cm from the midline On November 25, he had a little precordial pain radiating to the left shoulder The final episode occurred on December 14 He was awakened at 5 a m *by pain in the throat, which passed off in a half hour,* to be replaced by tingling pain beginning in the left hip and descending down the left leg At the same time, there was milder pain in the right hip and leg The patient was unable to move his left leg owing to the severity of the pain During the rest of the day he felt very poorly, and his pulse was weak and irregular At 2 p m he became very cyanosed and dyspnœic, and died in 25 minutes, about 9½ hours after the onset of the pain in the throat

Autopsy—The pericardium was distended by a massive hæmorrhage, 1,200 c c by volume The heart was hypertrophied, the coronary arteries were patent The aorta revealed a dissecting aneurysm extending from the base of the aorta to the bifurcation of the common iliac on each side, the false channel lay posteriorly to the aorta as far as the bifurcation, but dissection completely encircled the iliacs It contained recent blood clot The primary rupture was L shaped, 2 5 cm in length, and lay 2 5 cm above the aortic valve in the right posterior position The external rupture into the pericardium could not be found The aorta showed moderate atherosclerosis and no evidence of syphilis *There was no peptic ulcer or other lesion to explain the* hæmatemesis

Histological study showed atherosclerosis, and medial degeneration of mild degree The split was in the outer third of the media No microscopic lesion of syphilis was found

Comment—The primary rupture took place in the common site, and likewise the rupture into the pericardium This external tear into the pericardium may be difficult to find, it is frequently hidden by one of the auricular appendages Very extensive dissection occurred within a few hours, the pain in the legs was undoubtedly associated with dissection of the common iliacs The attacks of precordial pain which occurred previously likely arose in the heart, though there was no gross myocardial damage, the electrocardiogram showed evidence of it

CASE 6

(Autopsy No 40 92 Western Division) The patient was a man of 52, suffering from severe hypertensive cardiovascular disease with cardiac and renal failure For six years, he had had headaches, breathlessness, and attacks of substernal discomfort following exertion He had had bilateral splanchnic neurectomy performed in two stages, January and March, 1939, at the Montreal Neurological Institute, but this had afforded only temporary relief Blood pressure before operation was 220/100 In November, 1940, he was admitted complaining of headache and failing vision Blood pressure was 226/140 The apex beat of the heart was in the axilla The cerebrospinal fluid was found to contain blood The patient died very suddenly while lying in bed

Autopsy—The pericardium was filled with blood, 1,000 c c in volume A 3 cm linear tear was found in the outer coat of the intrapericardial aorta The primary rupture was placed transversely in the ascending aorta, 6 cm in length The dissection extended distally over the arch and the upper third of the descending thoracic aorta, and also involved the roots of the arteries of the neck The aorta showed marked arteriosclerosis with calcification and ulceration The heart was extremely hypertrophied (780 grm), there was no old or recent infarction, but the coronary arteries were hardened, calcified, and reduced in size There was a large recent hæmorrhage in the right occipital lobe of the brain, it was in close apposition to the posterior horn of the ventricle, without actually rupturing into it The fluid in the ventricles was bloody

Histology—The aorta showed marked intimal thickening The media in the region of the dissection showed infiltration of round cells and polymorphonuclears

Comment—Cerebral hæmorrhage associated with dissecting aneurysm has been reported in a number of cases One may only speculate on a causal connection

CASE 7

(Autopsy No 41 70 Western Division) This patient, a woman of 61, was running for a street car, at 2 p m, when she felt an excruciating pain in the left chest that ran through to the interscapular region She was taken to the hospital by taxi, and brought in in a state of shock The blood pressure was 92/62 The pain persisted in spite of morphine About 7 30 p m she suddenly became cyanosed, pulseless, and the respirations were gasping, death occurred in five minutes The duration of the illness was 5½ hours

Autopsy—The pericardium contained about 200 c c of blood, mostly clotted The external tear was not evident The primary rupture was in the ascending aorta, 3 cm above the aortic valve, it was placed transversely, and 5 cm in length Dissection was limited in extent, reaching only 7 cm distal to the aortic ring There was no atheroma at the site of the tear, though distally it was marked in degree The heart was moderately hypertrophied, but showed no infarction The coronary arteries were thin walled and patent

Histology—The media showed marked degenerative changes, muscle atrophy, crowding of elastic lamellæ and interruptions in the elastica Dissection occurred in the middle third of the media There was associated arteriosclerotic changes

Comment—Here the primary tear was associated with sudden physical exertion—a common finding The primary and external rupture occurred in the common sites The microscopic studies showed well marked idiopathic medionecrosis of the aorta

CAUSATION

1 *Mechanical injuries*—These are really rare factors A few cases have been reported, *e g*, blow on chest, crushing injury, bomb explosion External injuries more usually cause rupture of the aorta without dissection On the other hand, severe or even moderate physical strains are frequently recorded, *e g*, severe muscular exertion while working, hurrying to an appointment, the passing of a stomach tube Then, cases of mental strain, such as a quarrel or epileptic fit (here combined with physical strain) are known But, again, cases with no increased strain are reported, occurring during sleep Of our cases, one occurred in a man of 59 while playing baseball, and another, a 63-year old woman was

seized with pain while running for a street car

It may be concluded, therefore, that sudden increase of blood pressure generally caused by some physical or mental strain is sufficient, even if of moderate degree, to determine the rupture of the media which leads to the formation of a dissecting aneurysm, but only when the vessel wall is diseased This sudden rise has to be regarded only as the immediate exciting cause of the primary rupture Both Sherman and MacWilliam believe, however, that the abrupt diastolic recoil is more important as a cause of primary rupture than is any increase of blood pressure caused by more deliberate systolic propulsion

2 *The inflammatory theory* —Syphilitic mes aortitis this is unusual, as absence of frank syphilitic disease of the aorta is generally regarded as one of the outstanding differences between ordinary aneurysm and dissecting aneurysm

In well developed syphilitic aortitis with fibrous replacement and interruptions crossing the laminæ of the media there is a tendency to localize the sac and prevent extension, but in some cases dissection is extensive In this connection, syphilis may weaken the wall in another manner, by toxic necrosis of the muscularis in the absence of infiltration or adventitial changes

Rheumatic aortitis degenerative changes here may play a part Rheumatic disease is only rarely found associated with dissecting aneurysm

"Dissecting aortitis" this is a condition described by Babes and Mironescu in 1910, in which *there are inflammatory* degenerative changes in the media with new vessels that give rise to small hæmorrhages, that do not originate from the lumen of the vessel itself Splits develop and ultimately the intima ruptures and dissection follows

3 *Degenerative theories* —Atheroma It was commonly held among some earlier pathologists, including Virchow, that the cause of dissecting aneurysm was atheromatous ulceration with dissection of the blood through the floor or the edge of the ulcer into the layers between intima and media, or media and adventitia

In examining a large number of cases, the prevalence of atheroma is striking, in 50% of a large series But the intrapericardial aorta, where the primary rupture usually occurs, is not the commonest site The patches usually appear distally, in the transverse part, and become more numerous in the descending aorta In only 4 of Shennan's 218 recent cases did the dissection begin in an atheromatous ulcer

Leary and Weiss (1940) reported a case of dissecting aneurysm in a rabbit which originated through an atheromatous ulcer, experimentally produced

Medial degeneration anatomically, the parts of the aorta farthest from the nutritive supply from lumen or vasa would be expected to suffer more from any harmful agencies, *i e* , the middle layer or inner two-thirds

Of the three constituent elements of the media, the elastic lamina are probably the most important Clothing them on either surface is wavy fibrous connective tissue The smooth muscle fibres pass obliquely between the laminæ, and are inserted at either end into the connective tissue In systole, the aorta dilates under control of the tone of the smooth muscle, allowing the strain to come gently on the elastic laminæ, and preventing sudden jerking The connective tissue acts as a check to prevent over stretching At this stage, the muscle passes into active contraction and initiates the contraction of the elastic membranes which is powerful

Delicate connective and elastic tissue *fibrils* are other important structures, passing across the interlaminar space and encircling the muscle fibres in corkscrew fashion These act to prevent free movement of the laminæ on each other

Toxic or nutritional changes tend to involve the muscle and connective tissue primarily, as one would expect, and secondarily, the elastic tissue suffers and becomes increasingly liable to loss of retractile power, to friability, fracturing, or granular disintegration Shennan emphasizes the importance of "faults", especially in the middle layers of the media, and of atrophic changes sometimes with complete disappearance of the muscle fibres in extensive areas associated with degenerative changes in connective tissues and elastica

One should beware of appearances that are not truly abnormal, such as fenestrations, and also artefacts Then again, there are the relatively physiological age-changes of fatty alterations of the connective tissue, muscle atrophy, and even slight changes in the elastica Still another factor to be considered is the nutritional loss adjacent to recent dissection, seen as large areas devoid of nuclei

In old healed aneurysms, the reparative processes obscure the degenerative changes of the

recent type, but degeneration occurs in the organized fibrous wall too

In all 15 (except 1 syphilitic) of Shennan's own cases, marked medial degeneration was found in relation to the primary rupture, and in 6, numerous "faults"

Erdheim described the lesion, and Moritz[3] first discussed it in the American literature under the label medionecrosis aortæ idiopathica cystica They spoke of necrosis developing focally in areas the seat of chromatiopic or mucinous degeneration, and tearing of the elastic elements with and without cystic degeneration

Rottino[2] reported 12 cases of dissecting aneurysm studied carefully by the serial block method In all 12 he found some degree of medial degeneration with muscle loss, crowding of elastic membranes, degeneration of collagen and elastic fibres, and formation of small fibrous scars He has shown small areas of regeneration of muscle in foci devoid of elastic tissue As to the distribution of the lesions, they were found in the ascending aorta and arch consistently, chiefly in the middle and inner thirds of the media, and only rarely in the descending aorta The same author studied the aorta by the serial block method in 210 routine autopsies, and in 92 he found medial degeneration The distribution of the lesion was similar to that in the aortas showing dissecting aneurysm There were no clinically demonstrable symptoms associated with these lesions

Vasa vasorum according to Tyson, dissecting aneurysms may be the result of disease of the vasa vasorum They may become obliterated by arteriosclerosis or inflammation, with resultant medial hæmatoma, and thus start dissection without a primary intimal tear

Association with coarctation of the aorta the congenital changes in the aorta concerned in rupture and dissection of its wall are chiefly those found at the isthmus The isthmus may be completely occluded or show any degree of stenosis

In 200 collected cases of coarctation of the aorta, Maude Abbott found dissecting aneurysm in 42 In 35 of these the rupture was in the ascending aorta, 5 near the coarctation, and 2 in the heart The aorta above the stenosis is frequently atheromatous, usually patchy and of mild degree

Experimental Work

The earlier experimental work dealt mostly with attempts to split the coats of the aorta by injecting fluid under pressure For example, Pennock (1839) succeeded in splitting the media by introducing a fine hollow needle between the lamina and injecting water This was accomplished in an apparently normal aorta as well as a diseased one

Jores in 1902 and Josué, began the experimental work which has a direct bearing on the degenerative changes in the aorta wall, producing arteriosclerosis by injections of adrenalin The modes of action were (1) increased blood pressure, (2) chemical action as a muscle poison, and (3) constriction of vasa vasorum to produce anæmic necrosis If amyl nitrite were given along with adrenalin, antagonizing its action on the blood pressure, one still got the poisonous effect on the muscle

A number of authors have claimed that they could produce dissecting aneurysm with adrenalin in rabbits Erb (1905) had one that dissected in the outer third of the media, there were necrotic foci in the media, and no atheroma Benneche believes that dissecting aneurysms can occur spontaneously in rabbits, however Leary and Weiss,[4] more recently, (in 1940), state that spontaneous dissecting aneurysm is unknown in rabbits They say that about 35 to 50% of normal rabbits show medial necrosis with a tendency to calcification, and that the lesion produced with adrenalin is more severe These changes can also be produced by feeding vitamin D for prolonged periods, and in this case the vasopressor element is lacking In the course of experimental work on the production of atherosclerosis by prolonged cholesterol feeding, they obtained a dissecting aneurysm which originated in an atheromatous ulcer Adequate cholesterol feeding will produce arteriosclerosis in 100% of rabbits, and in normal rabbits examined, it was found to occur in less than 1%

Pathogenesis

In most cases the primary rupture is brought about by a sudden increase in blood pressure, due to physical or mental stress This acts upon the already diseased aorta to produce the primary rupture Now the most advanced degenerative changes do not always occur at the site of the rupture, and in fact are fairly wide spread, and so an additional factor, the mechanical, must be considered The great majority of

primary ruptures occur in the first part of the aorta, as we have seen, and so the forces in play must be examined

First, the mechanical influence of a high systolic blood pressure acts in elongating and distending the aorta in its ascending part Moreover, the direction of the blood stream is more or less suddenly altered as it passes from ascending to transverse part, and again from transverse to descending Hence one would expect the greatest strain would be along the outer curvature of the arch and at the junctional turning points, but the primary ruptures do not occur there usually And, after all, the systolic propulsive force is exerted chiefly longitudinally, parallel to the axis of the lumen and *will have a greater effect in elongating the vessel* if there are irregularities, *e g*, atheromatous plaques, on the inner surface to increase frictional resistance These irregularities are not common in the ascending aorta

Shennan[1] therefore believes that it is the diastolic force which is important, the abrupt diastolic recoil meeting the resistance of the closed aortic valve In diastole, on closure of the valve, the longitudinal force is largely converted into a transversely acting force with consequent lateral stretching and distension of the intra-pericardial aorta Further, in the dilated portion which bulges above and below the ridge formed by the right pulmonary artery, there will be an extra drag on the wall along the line where it loses the support of that artery, and along this line, chiefly below the artery, there will again be a tendency to rupture An additional factor is the rigid attachment of the pericardium at its reflexion

At the moment of rupture the transversely acting force will come specially into operation and impel the blood outwards into the wall, and at the same time the longitudinal component will separate the edges of the tear The edges of the tear will at first be pressed outwards, but if the transverse force is equalized by the persisting outer layer of the wall, the edges of the tear will return to their former position or even project inward This provides obstruction to the blood, which will force its way obliquely into the rupture The longitudinal force will now exert its effect causing the blood to pass parallel to the laminæ During diastole the dissection will extend proximally, to its limit, which is the aortic ring, and during systole the dissection proceeds distally till the blood either penetrates to the exterior of the vessel or re-enters its lumen, or ceases to extend and forms a hæmatoma of the wall, with subsequent clotting *in situ*

The other important location of primary tears is in the region of the ligamentum arteriosum It is questionable if the ligamentum acting as a rigid band is the sole determining factor, in that case one would perhaps expect to find ruptures in the left pulmonary artery at the other end of the ligament The more valid explanation seems to be that at the ligamentum one passes from the relatively free arch to the relatively fixed descending aorta, and that at every pulsation there is a hinge-like motion at the junction between the two This implies an enhanced tendency to wear and tear, and to degeneration of the wall

As to the factors involved in secondary rupture to the exterior or interior, this will depend largely on the severity of the initial transversely acting force and the resultant plane of dissection, on the presence of atheromatous plaques extending into the wall or other obstruction of an anatomical nature, such as an outgoing branch

Re entrance of the dissection into the lumen is by no means a safeguard against fatal rupture to the exterior That organization and healing can take place is largely due to the circulation permitted by the distal re entrance of the channel, in the outer part the tissues are well supplied with vessels from which organization can take place There results a well-formed fibrous connective tissue covered by endothelium

SUMMARY

Seven cases of dissecting aneurysm are reported In the majority, 5 cases, primary rupture took place in the ascending aorta just above the aortic ring The tear was not associated with an atheromatous patch in any one of them In all 5 exit was due to external rupture into the pericardium with resulting tamponade

The second common site of primary rupture is the isthmus of the aorta Of the 2 cases presenting the tear in this location one terminated with an extrapleural hæmorrhage, and the other produced a re-entrance rupture in the abdominal aorta, and "healed"

Dissection was always in the layers of the media and the extent varied from a few centimetres to involvement of the entire length of

the aorta and the proximal part of its main branches

Medial degeneration was found in 5 cases, but may well have been demonstrated in the other two by more extensive histological study

Though arteriosclerotic changes were noted in the aorta in every case, there was no apparent relation to the primary rupture or the dissection

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TUBERCULOUS ASCITES IN AN AGED NEGRESS

By Nelson M Webster, M D, D N B and Donald deF Bauer, M D, C M

Winston-Salem, N C, U S A

THE following case is reported to emphasize that tuberculous disease is not so extremely rare in the aged that it may be dismissed from consideration on the basis of age alone, as was done in this case, prior to exploratory coeliotomy

CASE REPORT

An 82 year old negress was admitted on September 12, 1942, with three complaints Abdominal distension for three weeks, "high blood pressure" for eighteen years, spells of giddiness and "shaking" for eight months Ascites of unknown causation was found as the explanation of her abdominal distension Ready confirmation of her claim of hypertension was obtained on examination (180/110) Her third complaint could have been explained on the basis of the hypertension, but was also considered in the differential diagnosis of the ascites

As early as May, 1942, she had suffered vague abdominal pains, not related to meals Her physician employed barium visualization of the gastro intestinal tract in seeking an explanation, but no evidence of disease was found

The patient was born in South Carolina and had lived only there and in North Carolina She married at 15, bore ten children, had three miscarriages, and worked from childhood until the winter of 1941 as a field labourer At 12 she had "pneumonia" Subsequently she had suffered no serious illness and had never consulted a physician until 1927, when intermittent headaches and giddiness of three years' duration caused her to seek medical counsel, whereupon the diagnosis of hypertension was made

No one in her family was known to have had cancer, tuberculosis, lues, or heart disease There was no history of alcoholism

The patient had had no cough, sputum, hæmoptysis, or night sweats There had been no chest pain, dyspnœa, cyanosis, or swelling of the ankles Her appetite was good, but she had lost forty pounds in the last seven years Fifteen years ago the patient had been advised not to eat meat because of her hypertension, and she had religiously followed this advice There had been no jaundice, hæmatemesis, or melæna The patient denied that she had ever had piles Her bowel habits had been regular No abnormal symptoms from other systems were found

This 82 year old negress was stoop shouldered and had moderate kyphosis of the dorsal spine She could walk easily and balance well with her eyes closed and her heels together The wizened face, thin and inelastic skin, shrunken breasts, dry and brittle nails, arcus senilis, and the ocular cataracts supported her claim of being an octogenarian Her pupils reacted to light There was no jaundice No adenopathy was found in the cervical, axillary, epitrochlear, or inguinal regions No pathological signs were elicited by examination of the chest The heart was not enlarged to percussion and was otherwise also not remarkable The abdomen was distended to the extent of a seven to eight month pregnancy but was soft (not doughy) and thin walled, with physical signs of fluid (wave and shifting dullness) There were no dilated veins or caput medusæ No tenderness and no abnormal masses were noted The spleen and liver were not palpable and liver dullness was slightly reduced There were no hæmorrhoids The pelvic examination was non contributory, normal senescent atrophy was noted No scars were found on the lower legs and there was no œdema of the sacrum or extremities, although wrinkling of the skin just above the ankles suggested that there had been some ankle œdema

On the basis of the above information the following tentative diagnoses were advanced carcinomatous peritonitis, hypoproteinæmia, tuberculous peritonitis, cirrhosis or neoplasm of the liver

Laboratory reports—The urine was negative There were 4,700 white blood cells, and a normal differential count Erythrocytes numbered three million and the hgb was 73% (8 2 grm) The Kahn reaction for syphilis was negative Serum proteins on September 19, 1942 were total 6 58, albumin 1 79, and globulin 4 79% An x ray examination of the chest revealed a small, discrete, opaque nodule at the level of the third rib antero laterally in the right lung field, near the periphery The left lung fields were normal The heart, aorta, and trachea were normal "The patient has a healed primary tuberculous infection which at her age is of no clinical significance" read the report The tuberculin patch test was negative

Course in hospital—The patient was given bed rest (with several hours up in a chair daily) and a high protein, high vitamin diet Her weight (recorded daily) fluctuated between 105 and 110 lb and was not significantly affected by the exhibition of theophylline Between 4 and 8 p m every day, her temperature rose above 101° F, falling again below 100° F by midnight This rise was not accompanied by a commensurate increase in pulse rate

The patient's advanced age seemed to exclude tuberculous peritonitis and favour the diagnosis of neoplastic disease She had a fifteen year history of low meat intake This and the wrinkled skin about the ankles led to the presumption that the serum proteins might be low The negative tuberculin patch test and the x ray findings lent support to the prejudice against tuberculous peritonitis in this old woman The inverted A/G ratio, the moderate anæmia and leukopenia, the daily spiking of her temperature record ("liver fever"), and even the "shaking" spells were considered explicable on the basis of hepatic damage from neoplastic disease The diagnosis of cirrhosis was less favoured because of the absence of jaundice or evidence of collateral circulation, the negative history of alcoholism and lues, the

* From the Forsyth County Hospitals and the Department of Medicine of the Bowman Gray School of Medicine, Winston Salem, North Carolina

negative Kahn test, and the absence of any signs of lues

On September 23 abdominal paracentesis was performed A straw coloured, cloudy fluid under low pressure was obtained It had a specific gravity of 1 022, gave a heavy precipitate with sulfosalicylic acid, and boiled solid It did not clot or separate into layers, and contained no sugar Numerous red blood cells, lymphocytes, occasional plasma cells and mesothelial cell clumps, but no malignant cells, were found

At the request of the patient and her daughter an exploratory cœliotomy was undertaken on October 1 The parietal and visceral peritoneal were found to be thickened and rough, and studded with red and white nodules between one and two mm in size Considerable ascitic fluid was encountered The omentum was intimately folded upon itself and was closely adherent to the stomach The liver was smooth and otherwise normal to palpation No abnormal masses suggestive of neoplasm could be found anywhere in the peritoneal cavity Small pieces of the parietal peritoneum were taken for pathological examination The sections showed chronic inflammatory tissue with definite tubercle formation

The postoperative course was perfectly smooth Good healing of the wound occurred The patient's afternoon temperature did not rise above 100 2° F after the first postoperative day, and by the tenth day (when the sutures were removed) her temperature was normal throughout the day The abdominal ascites gradually decreased and the A/G ratio rose from 0 37 to 0 95

DISCUSSION

Ascites, found in an octogenarian negress having a five months' history of vague abdominal distress and a three weeks' history of abdominal swelling, was considered more likely to be neoplastic than tuberculous in origin because of the patient's advanced age This consideration was founded on the authors' belief in the popular notion that tuberculosis (and particularly tuberculous ascites) is a rare disease in senescence Thewlis[1] and others have attempted to dispel this notion and to impress on medical men the fact that the aged are being neglected (and inadequately examined), and that tuberculosis and other diseases will be found frequently in those over 60 if and when practitioners take the trouble to look for them

Moffitt[2] gives 50 as the usual age limit for tuberculous peritonitis Wunderlich[3] reviewed 176 cases of tuberculous peritonitis with ascites the average age was 21, the extreme ages were 2½ and 60 Hamman[4] has reported 5 cases in patients between 50 and 60, 4 between 60 and 70, and 2 between 80 and 90 Buchbinder[5] cites statistics of Cummins[6] "which showed an age variation of 16 months to 73 years" There is no dispute with Sweet's statement[7] "It should be remembered that the greatest number of cases of tuberculous peritonitis occur between the ages of 20 and 40 while fluid from carcinoma occurs most frequently after 50" On the basis of present knowledge that statement is acceptable, but were sufficient interest taken in the study of geriatrics by practitioners everywhere, many new instances of tuberculous peritonitis among the aged might be discovered and it might soon be necessary to revise the above generalization

CONCLUSION

Experience with a case of tuberculous peritonitis (the diagnosis being established by peritoneal biopsy) in an 82-year old negress has convinced the authors of the importance of recognizing that advanced age should not exclude the possibility of tuberculosis

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Case Report

RENAL DWARFISM

By Florence S McConney, M D,
Jessie McGeachy, M D and Anna Gelber, M D

Toronto

The following case is judged worthy of record

Miss L G, a girl of 16 years was admitted to the medical ward of the Women's College Hospital, Toronto on January 7, 1943, with the complaints of fatigue and weakness, increasing over a period of one year The personal and family history contained nothing of importance

History of present illness—About a year ago the patient began to complain of weakness fatigue and nausea On her doctor's advice she stopped attending school and has felt slightly better since but did not like to go out as she had difficulty in walking due to stiffness at the knees which increased during the day

Recently she had headaches, earache and epistaxis and her doctor advised admission to hospital for examination *Her mother stated that her leg bones were* bending outwards while her knees seemed to be turning inwards and she was much shorter than her siblings

The functional inquiry showed little of importance

Physical examination—The patient resembled an undernourished ten year old child being 4 ft 4 in in height and weighing 56 lb Underdevelopment was symmetrical No secondary sexual development was apparent Skin showed a marked yellowish pallor There was no œdema Skeletal system presented no abnor-

mality except valgus of knees The important findings were as follows

The chest showed many fine crackling rales, constantly present after coughing, in the left apex anteriorly There was a harsh systolic murmur heard all over præcordium, maximum in mitral area but not transmitted No diastolic murmur heard in left lateral position Blood pressure 120/70

The patient was cooperative and emotionally stable, mentally immature and childish Routine examination showed no evidence of central nor peripheral nervous lesion Tendon reflexes were brisk and equal, and there was bilateral plantar flexion

Blood examination —Hgb 24%, white blood cells 6,400, red blood cells 1,050,000, colour index 1 1, neutrophiles 60%, lymphocytes 32% Red blood cells in smear showed little variation in size and shape and were well filled with hæmoglobin Platelets were scarce and no immature cells were seen

Urinalysis —Reaction acid, specific gravity 1 005, albumin trace, sugar negative, acetone negative, microscopic, few epithelial cells No casts were found on repeated examinations

Results of special investigations were as follows Blood Wassermann test negative Intracutaneous test with 0 1 tuberculin (1 2,000) negative Sputum and smears from stomach contents negative for tubercle bacilli X ray of chest showed peribronchial markings extending into both apices Markings in right lower lobe extended to periphery There were no definite signs of parenchymal tuberculosis Fasting blood sugar 107 mgm Icterus index 5 mgm Stools, benzidine negative Sedimentation rate 23 mm Blood cultures negative repeatedly Sternal puncture yielded no bone marrow for examination, although the aspirating needle was felt to enter the marrow cavity Liver therapy, a test dose gave no reticulocyte response

Gastric test meal —The gastric analysis showed free HCl in normal amounts

Kidney function test —Two hour test

9 a m	60 c c	specific gravity	1 008
11 "	90 "	" "	1 009
1 p m	75 "	" "	1 007
3 "	122 "	" "	1 008
5 "	75 "	" "	1 007
7 "	73 "	" "	1 008
Total day	495 "		
Night	195 "	" "	1 008

Non protein nitrogen on February 18, 211 mgm , February 19, 213 mgm , creatinine 4 5 mgm

Treatment and progress —The patient was kept in bed on a high caloric diet On January 9 patient was given 250 c c of blood She felt better and on January 11 the hæmoglobin had risen to 38% By January 19 the hæmoglobin had dropped to 29% and though iron therapy (ferrous sulphate gr v t i d) was kept up the hæmoglobin never rose again above 35% Her temperature did not rise above 98° and her blood pressure ranged from 120/70 to 138/90 No marked change occurred until February 10 when she began to vomit and from then on she became progressively worse

The combination of negative blood cultures, normal sedimentation rate and negative heart findings (except the systolic murmur which it was felt was due to the profound anæmia) appeared to rule out bacterial endocarditis

The unchanging blood picture and the negative sternal puncture reduced the possibility of the case being one of lymphatic leukæmia

The negative tuberculin test and the negative chest plates eliminated the diagnosis of pulmonary tuberculosis

As the patient grew steadily worse, Dr Ray Farquharson was called in consultation He made the diagnosis clinically as one of renal dwarfism At that time the non protein nitrogen was 213 mgm The patient became comatose and died three days later

Autopsy report —The essential findings were as follows

Lungs pitted on pressure and in content was less than normal Some alveoli contained albuminous fluid and some were emphysematous Many septa were absent Thickening of visceral pleura was seen at apex Heart weighed 230 grm Muscle was flabby but otherwise normal Valves were normal There were many fat droplets in the liver cords Adrenals were normal in appearance and on section

Kidneys right 6 5 cm long, from 2 5 to 4 cm wide and 2 6 cm in its greatest thickness Weight 33 grm, pale pinkish grey The cut surface showed a cortex 3 to 5 mm wide There were many cysts 1 cm in diameter The capsule stripped readily, leaving a mottled surface Left 7 5 cm long, 2 75 to 4 cm wide and 2 25 cm thick Weight 31 grm On the cut surface numerous small cysts were seen varying in size from a small pinhead to 1 cm in diameter Microscopic the architecture of both kidneys was lost There were small hyalinized glomeruli and large glomeruli but few of each, in dense fibrous tissue showing vestiges of tubular epithelium degenerating, tubules and lymphocytes Section of one kidney showed scattered tubules in a connective tissue stroma Mononuclear cell infiltration was seen through the stroma The proximal convoluted tubules showed degeneration of their lining cells and many of the lumina contained albuminous fluid The collecting tubules appeared small and shrunken, and their lining cells were flat Large collections of mononuclear cells were seen and there were many engorged blood vessels The number of tubules was greatly diminished A few normal glomeruli were found showing engorged capillaries and some glomeruli were completely fibrosed and others partly so The other kidney showed fewer engorged blood vessels, but the inflammatory reaction throughout the interstitial tissue was also marked in this kidney A fibrous thickening occurred around many glomeruli and many showed albuminous fluid inside the capsular space, with few if any of the tuft cells remaining Proliferation of cells of the capillary tufts and accumulation of fluid left only small crescents in many glomeruli

Uterus, tubes and ovaries, small, normal

Sternum, pinkish grey marrow On section presented normal appearance The majority of the cells were myelocytes and metamyelocytes with numerous erythroblasts and normoblasts

COMMENTARY

In 1941 Danis and Rossen,[1] of St Louis, Mo, reported a survey of 200 cases of this disease They state that the etiology is unknown but the disease is familial They claim there is no evidence to justify the idea that the disease is primarily of pituitary origin There is a renal retention of phosphates which results in their high excretion into the intestinal canal where they combine with calcium, producing a depletion of calcium in the bones Also the state of chronic acidosis resulting from renal damage puts a great demand on the body for a fixed base, thereby removing calcium from the bones Hence the frequent spontaneous fractures these cases show They mention a theory by Smyth and Goldman that there is a disturbance of parathyroid control, resulting in dwarfism due to Thompson's antigrowth factor of the parathyroid, associated with parathyroid hyperplasia

Graham and Hutchinson[2] of Glasgow University, give a *resumé* of three cases in a family

of eight children In their cases there were no casts in the urine and no hypertension, which were the findings in our case They feel that renal dwarfism is due to congenital hypoplasia of the kidneys rather than to a chronic nephritis They quote Coplin who suggests that this is due to defective arteriogenesis with consequent defective development and scarcity of secretory units Such an inherent fault in the germ plasm might explain the family incidence In their cases, as in ours, there was no evidence of renal infection and the Wassermann test was negative

We regretted that we were not able to examine at the autopsy either the parathyroids or the pituitary, but from the clinical evidence and the pathological findings in both kidneys, we felt that the diagnosis of renal dwarfism was correct

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Special Article

PUBLIC INFLUENCES OF THE MEDICAL PROFESSION*

By Professor E G D Murray, O B E, M A, L M S S A, F R S C

Montreal

The medical profession has, in the words of Dr T C Routley, "served the people well preserving what is perhaps the highest code of ethics in the world and attracting to its ranks many of the keenest minds of each generation" The truth of this statement is substantiated by the achievements of modern medicine These are not confined to the alleviation or cure of individual cases of illness, but, much more importantly, they are most effectively extended to the promotion of the public health and the prevention of disease Naturally, the active control of any cause of general illness is the application of hard earned knowledge gained by the close study of individual cases

Through generations of unselfish work the medical profession has expanded its knowledge so masterfully that the terrors of epidemics have been removed Not only are civil communities saved from scourges which preyed upon them in the past but armies are no longer racked by the pestilences which determined the course of wars and wrote human history throughout the ages I have no doubt that this marvellous prevention of epidemic disease ranks higher and looms larger than any other human achievement but the exercise of the control today remains with the medical profession in certain limited instances only and we are fast declining to the subservient position of technical experts

Many endeavours conceived and instituted by the medical profession have become restricted or have been usurped and their genesis has become buried in the pages of the past There may come a day, and it is long overdue, when a thoughtful medical historian will write the chapter of the public debt to the profession

There are the biographies of noteworthy individuals, from whose work so much has been derived, and there are treatises and monographs on special subjects and histories of institutions, each teaching their special lessons But these are read only by the few already learned in the subject and none of them are designed with the purpose I have in mind I believe there is a need for an impersonal history, devoid of the glorification of individuals or institutions, omitting technical details and controversial points, but stating in plain words the development of medical knowledge and its consequences, in a way to be read and remembered by the multitude

I believe this work is needed to overcome the wrong and stultifying opinion which seems to prevail, that medical care is a purchasable commodity like any utility It is needed as a basis on which to restore to the medical profession the guidance and development of public health together with the control of pernicious tendencies and practices It is needed to bring a proper realization to everyone, particularly to those entrusted with national or local government, that the medical profession must be consulted on matters, great or small, which are its concern

Is it not a warning and a sign that Canadian Medicine has to raise its voice to force a hearing of its opinion on the question of National Health Insurance? Power has lapsed too completely into the hands of officialdom and the situation is not improved by the relative sparseness of medically trained personnel in positions of authority, even if those few were numbered among those keenest minds attracted to the study of medicine

Official health departments are good or bad according to the quality of their personnel, the liberty of action and authority accorded to them, and the support they receive from the medical profession Of these the last is not the least important, although it does not seem to be prominent at the present time

Why do we not discuss among ourselves the latest actions of Departments of Health?

*The Presidential Address given before the Annual Meeting of the Montreal Medico-Chirurgical Society, May 21, 1943

Reprinted in part from *The Bulletin* of the Montreal Medico-Chirurgical Society, August, 1943

Problems of preventive medicine are not subjects of hot discussion in a Society such as ours Surely they should be and our opinion should influence the Departments of Health I am not certain that we can be proud of our support of health measures instituted by the Departments of Health, such as diphtheria immunization, nor do we stir them to greater efforts There is, it seems to me a complacency on our part, a tendency to leave it to the other fellow which is unsound and improper

But there is the other side too Have the Departments of Health good reason to command our confidence? I see one reason why they have not and that is the permeation of politics into a subject with which it should not have any association The intrusion of the politician, either to dictate the choice of personnel, or to impose patronage lists, or to limit action and authority for political reasons is pernicious and prevalent Under such circumstances it is not to be expected that official health authorities can receive our unqualified support

The situation is an ugly one and the consequence is that the practice of preventive medicine in Canada is quite inadequate This is a sorry case and the magnitude of its ills can only be appreciated properly by the medical profession, no lay person or committee has the knowledge to judge the cause or assess the values There is a widespread absurd supposition that the business man and the lawyer can give a sound judgment and take wise action on any situation whatever It is manifestly untrue and often the cause of great misfortune We must prescribe the cure ourselves or it will undoubtedly be treated with the quack medicine of political expediency It may require that we exert our professional prestige to the full extent of its power and our aim must be that we put our Departments of Health in such a position that they not only deservedly receive our support but command our admiration

In Canada we have Federal and Provincial Governments all vying with one another over political issues Unfortunately, we have as many Departments of Health more or less tarred with the same brush I have talked with various persons of authority and the arguments I have heard only confirm my conviction, that health and education should not only be Federal responsibilities but should be freed of all political influences My personal opinion is that they should not even be a Ministry, but should be directly under the Crown as a Council of State for Public Health and Preventive Medicine

The oldest and at one time the most respected influence of medicine on the general public was the individual physician's personal power for good Within the memory of many of us, the general practitioner was "the guide, philosopher and friend" of his patients He saw them into and out of the world, and between whiles consoled their sorrows or patched up their differences It was a grand and beneficial influence exercised with patience and kindness or with stern severity as occasion demanded No priest of any religion possessed such powers or ever exercised them with such wisdom

There may still be such men, but this era of specialists seems to tend towards patients becoming interesting subjects numbered in a case-book In super-specialization there is the serious danger of patients suffering because of a condition referred to cleverly by Sir Archibald Garrod as "Polyiatry", we have all known this circumstance, and, as I have seen it, it is fraught with greater calamity than "too many cooks"

Yet we must recognize the need for special skill and knowledge to cope with the increased complexity of accurate diagnosis and effective treatment in certain disease processes Only let us be wise enough to avoid exaggerating this circumstance to absurd proportions The public has need of the general practitioner, and the true value of specialization can only be reached when cases are sorted and those requiring the specialist are referred to him by the general practitioner

The well known jibe about "knowing more and more about less and less" has an uncomfortable element of truth in it Very few of us escape from minor physiological derangements which are very easily over-emphasized, until, in the end, we have an unhealthy mind in a coddled but reasonably healthy body With the best of intentions, certain specialties can most easily be led by excess of enthusiasm into this error There can be little doubt that such patients would often be happier and ultimately healthier treated by the general practitioner using palliative measures and common sense

There is one responsibility to the public which the medical profession has not met properly as yet An ever increasing uncontrolled dissemination of falsehood, misrepresented in pseudomedical jargon, with purpose to sell patent medicines at great profit, is blared out by radio and luridly printed in newspapers and carried in the mail as pamphlets There is the greedy encouragement of the public to the use of recognized drugs to excess on their own initiative, by drug houses of otherwise good reputation There are the distorted reports of medical meetings and of medical achievements by uninformed reporters writing in the daily papers There are the ridiculous claims for dubious and useless disinfectants

Neither the courts of law, nor the Food and Drugs Act, nor even ordinary common sense, protect the public against these impostors and these bearers of false tidings The harm done is great and the Departments of Public Health are powerless because the laws are inadequate and are easily evaded by tricks in wording the advertisements There is no protection other

than the public's faith in their medical advisers and that is not succeeding Surely we should take strong measures to expose and destroy the infiltrating perverters who are a degree worse than those other limb-twisting mountebanks The remedy is the more difficult because part of the cause is age-old and imbred, as Bacon observed, saying "Men will often prefeire a Mountebanke or Witch, before a learned Phisitian"

There is also a "secondary infection" in the form of the ever-increasing cost of effective medical treatment This is an interesting and very important aspect of the case, in which the profession must again be the ever-watchful guiding hand A partial remedy is being devised by officialdom and financiers, but to my mind their devices are palliative and not specific

The remedies proposed by the business mind are Group Insurance, National Health Insurance and Social Security These are a family of "drugs", resembling the sulfonamides in character, in that they give immediate improvement in certain conditions and so are very useful, but they do not institute any permanent immunity They, like the sulfonamides, are limited in what they can do and cannot cure all ills

The reason for the greater cost of modern medical treatment is not the fees of the doctor, nor is it the cost of primary hospital services, rather is it the cost of the newer remedies, and the fancy prices for supplies Serums, new sulfonamides, bactericidal agents like penicillin etc may cost up to $100 00 or $500 00 for the treatment of one case Laboratory services are essential to modern diagnosis and treatment of disease and are costly The cost of laboratory services is not due to high salaries paid to laboratory workers in Canada nor is it due to high fees, because these are a small fraction of what is charged by the clinical specialists The cost of laboratory services is due to the high cost of maintenance and supply of laboratories

The excessive cost of drugs and medicine remedies is due to the stranglehold the drug houses have acquired and it seems to me there is a danger of their gaining a controlling and directing influence over medicine In certain respects doctors are becoming the salesmen of the drug houses The pernicious practice of patenting therapeutic agents and methods of their production plays an important part It all reverts in the end to the business man's primary urge to acquire money aided and abetted by the undue and unworthy adulation of wealth

Compare the unselfish code of ethics and the far-reaching education of the medical profession with the elastic ethics and very limited knowledge and education required by big business and what a contrast it makes

The cost of efficient laboratories is due to similar causes Any article required by a laboratory costs many times more than an equivalent article produced for sale to the general public for example a photoelectric comparator or a potentiometer costs much more than a good radio Even the railway charges more to carry a crate of rabbits to the laboratory than it does to carry the same crate of rabbits to the market It is true that the primary cost of production of certain requirements is high but this is boosted by the overheads of the commercial companies and excessive advertising

Now if we are to get down to primary causes to cure the ill we must take measures to reduce the excess profits and the cost of doing the work and not simply provide more money for the individual to pay for the excessive expense of his illness There is no tax or advertisement for which the consumer does not pay, so any measure which simply pays for medical care is a palliative and not a cure Insurance schemes will not reduce the cost of medical care and in the end must restrict the medical services to less costly procedures than the case requires This means that insurance schemes cannot bring to the sick the advantages of the newest knowledge By all means help to pay for treatment, but above all reduce the cost of treatment so that the best is available to everyone

Yet another great medical influence has been exerted by the hospitals Through the centuries the people have learned that they must go into hospital to get the newest and most competent treatment of their illnesses And for good reason, the respect for a doctor is greater if he is on the staff of an important hospital The medical autonomy of the great hospitals has been largely responsible for the development of this well deserved faith and respect This is something the profession is rightly proud of and must protect from destruction

It is to be hoped there is no danger that the great and generous and public-spirited activities of hospitals will be overcome by the vote wise politicians and the dollar-wise economists and insurance merchants who are deliberating the way medical care of the sick shall be secured

Although I regard National Health Insurance as inevitable and even desirable, I regard the method of its introduction with some apprehension

The last important medical influence I wish to consider is that exercised through teaching and research in the Universities The teaching of Medicine is among the oldest and most important of university functions and it seems likely to stay with us However the pamphlets and even books circulated by the drug houses are steadily acquiring an ascendency as disseminators of information to practitioners This information is cleverly calculated to accomplish sales under a veneer of disinterested

truth and is frequently accompanied by reprints of papers by obscure foreign authors Often they are expensively dressed up and with a pretence of reticence you are told, in a footnote or postscript, that the ideal drug to treat this condition is made by such and such company This is an insidious process and it is not to the credit of the profession that the drug houses find it worth while

On the old principle that the consumer pays, the drug houses not only flood the mails but have set up elaborate and efficient research laboratories These laboratories have highly qualified staffs and publish a great deal of excellent work, which is carefully protected by patents whenever possible The comparative poverty of the universities places them at a disadvantage in competing with the drug houses for staff and equipment Now the research output by universities is being eclipsed and their all too small staff is so burdened with teaching that research is practically out of the question

What does the future hold? Philanthropic donations are likely to be rare and endowment of research by commercial concerns still more rare because they have their own laboratories Modern new equipment and proper circumstances for high grade research is almost out of the question now in most Canadian universities, and, since they cannot offer real opportunities, their staff is likely to deteriorate and the teaching will be uninspired

The alternative is Government support for hackwork teaching and very limited research opportunity in the universities, while the best of the students go to the commercial laboratories This is what should be combated, for not only would it be a disaster to have medical progress dominated by the drug trade, but it would lead to deterioration of staff and teaching in the universities and so a general decline

The trends and tendencies I have presented to you are all severally well known but I think it is necessary to assemble them more completely than I have had time to do and to consider their meaning We are in danger of surrendering our influence on public health and preventive medicine to the politician, through losing contact and interest in the Department of Health We may easily lose the direction of hospitals to a Governmental bureaucracy and to insurance companies, through not insisting on a powerful representation on committees appointed to devise insurance schemes We are allowing drug houses to assume a self-interested direction of medical development and dissemination of medical information, detrimental to medical practice and teaching, as well as endangering the continuance of research in universities We might see the individual doctor relegated to a civil service appointment, subject to political expediency and patronage, through an uncontrolled development of state medicine

A certain drifting inactivity of the profession as a whole has allowed control to slip partially from its grasp These are tremendous times of war which will be followed by feverish reorganization of the very fabric of society The medical profession must exercise its leadership more definitely and to a greater degree than ever before, in order to secure a sane Medical Social Security controlled by scientific medicine and a proper maintenance of standards and opportunity in medical education and research

Editorials

PLANS FOR SOCIAL SECURITY

THERE is in all plans for social security the inescapable responsibility for the health of the people It appears in the famous Beveridge Plan, it is occupying the attention of a special Parliamentary Committee in this country, it is receiving the study of a similar committee in Australia, and a National Health Service Commission is at work in South Africa The particular methods to be employed by each country in dealing with this obligation are still to be worked out We will not refer to them now beyond saying that they have without exception aroused the very keenest interest, and in England especially, very strong criticism

Plans in the same direction are now being discussed in the United States In June of this year there was brought before the Senate and House of Representatives the Wagner-Murray-Dingell Bill, so named after its sponsors This is a measure to "alleviate the economic hazards of old age, premature death, disability, sickness, unemployment and dependency, to amend and extend the provisions of the Social Security Act, to establish a unified national insurance system

"to provide a Federal system of unemployment compensations for temporary disability and maternity benefits' to promote preventive health services and enable the several states to provide for the aged, the blind, dependent children and others

The details of this need not concern us here But it may be said that it combines many aspects of the Marsh report and the proposed Health Insurance measure to be brought forward at Ottawa Some of the points may be enumerated For example, it would provide for (*a*) Medical care by practitioners (*b*) Specialist care (*c*) Hospitalization (*d*) Laboratory and related services including x-ray, physiotherapy special appliances and eye-glasses (Dentistry and Home Nursing are not included, nor are drugs except during hospitalization) A study is to be made of these features under (*d*) with the idea of including them within two years after the measure goes into force

There is to be free choice of physician, and a list of specialists is to be prepared "utilizing standards and certification developed by competent professional agencies" "The services of specialists shall ordinarily be available only upon the advice of the general practitioner" Payment to general practitioners shall be made (*a*) on a fee basis, (*b*) on a *per capita* basis, (*c*) on a salary basis (whole time or part time) or (*d*) on a combination or modification of these bases

Hospitalization — in listed participating hospitals—would be provided for a maximum of 30 days in any year, although it might be increased to 90 days Mental disease and tuberculosis are not covered

There would be a pay-roll deduction of 6% from employed persons Employers would contribute a corresponding amount In the case of employees of States or Municipalities the contribution from each would be 3½% of the wages Self-employed persons would pay 7% of the market value of their services but would not be covered by the unemployment provisions Wages or earnings over $3,000 00 a year are not considered in computing the payroll deductions from employees or the payment from the self-employed, such persons, however, would be eligible for services

Responsibility for the professional and technical phases of the administration is placed with the United States Public Health Services Basic administration and financial aspects come under the Social Security Board On border line details the two bodies would act jointly Rules and regulations would be issued by the Surgeon-General of the United States Public Health Services consulting with the Social Security Board and obtaining the approval of the Federal Security Administrator Contracts with physicians hospitals etc would be with the Surgeon-General Hearing and appeal bodies would be set up by the Surgeon-General

Two national advisory bodies would be set up The Federal Social Security Advisory Council would be advisory to the Social Security Board, by which it would be appointed and would be made up of men and women representing employers and employees in equal numbers and the public

The other council would be advisory to the Surgeon-General and would be known as 'The National Advisory Medical and Hospital Council' The Surgeon-General would be Chairman and there would be 16 members appointed by him These would be selected "from panels of names submitted by the professional and other agencies and organizations concerned with medical services and education and with the operation of hospitals and from among other persons agencies or organizations informed on the need for or provision of medical, hospital or related services and benefits Each appointed member shall hold office for 4 years and would receive as remuneration $25 00 per day while attending meetings etc, plus travelling expenses" This council would advise with respect to professional standards designation of specialists, co-ordination of services hospital standards, methods of payment studies and surveys of health services, grants-in-aid for professional education and research projects and the establishment of special boards or committees

The unemployment insurance system would be operated under the Federal Government rather than under Federal-State aspects

Perhaps the most significant point in this plan is the very great power placed in the hands of the Surgeon-General Neither in Canada nor in Great Britain is it proposed to give such authority to any one man

We are not in a position to report on the course of this proposed legislation It is in an immature stage and will probably undergo very great modification We learn from the *Journal of the American Medical Association*

however, that severe criticism of it has already been voiced in both medical and lay quarters As would be expected, it is the political implications which are regarded with the most distrust

TORONTO STUDIES ON PENICILLIN

THE work on penicillin in the Banting Institute, University of Toronto, was initiated several years ago by Dr Philip Grecy, of the Department of Pathology and Bacteriology, with the help of Dr Alice Gray, soon after the announcement by Florey and his collaborators of the work at Oxford A study of the cultural conditions for growing the mould *Penicillium notatum* was first undertaken in the hope of being able either to increase the rate of growth of the mould or to augment markedly the total amount of penicillin elaborated Months were required to study the influence of traces of certain elements (such as copper, manganese, zinc, boron, etc), of vitamins, of yeast and soil extracts, corn steep liquor and many other supplements, as well as the effect of temperature, light, aeration and other factors The first studies were done in 500 c c flasks which could contain only about 100 c c of medium, since penicillin production is best on thin layers of substrate As experience was gained larger vessels were adopted for these experiments This work ultimately served to define the conditions necessary for high yields of penicillin when the mould was grown on large volumes of culture fluid

The culture studies had progressed so favourably by the end of 1942 that application was made to the National Research Council of Canada for a grant to enable all phases of the problem to be attacked with greater vigour This application was favourably received and funds were made available to Dr Philip Greey and Professor C H Best for expansion of the work going on in the Banting Institute with the object of determining methods of growing the mould on a still larger scale and of devising extraction procedures which could be utilized commercially

The scale of the culture experiments soon reached such a magnitude that the capacity of the sterilizers in the Banting Institute was exceeded The Toronto General Hospital generously offered the use of their large sterilizing facilities and provided some essential equipment required to handle the increasing volumes of liquid

Professor C H Best, head of the Banting and Best Department of Medical Research, turned over the facilities of the biochemical division of his department to the investigation of isolation procedures amenable to adoption in a plant working on a commercial scale, and asked Dr C C Lucas to supervise the chemical aspects of the problem Dr Lucas assigned the industrial scale extraction problem to Dr S F MacDonald Within three months preliminary experiments had pointed the way to a method which seemed promising and construction of a pilot plant was begun to test the behaviour of the process on a larger scale This pilot plant has now been in operation for several months as an experimental unit in which various problems associated with large scale production have been studied A process which appears to be adaptable to commercial scale production of penicillin has been worked out although numerous small improvements are still being effected in the design of the equipment used

The principles involved are not new but some of the practical problems encountered in handling such a labile substance in large quantity have been overcome Countercurrent extraction at lowered temperature, careful pH control and utilization of a suitable buffer (to avoid strong alkalies) for the re-extraction into water are the main features An ingenious method of removing excess buffer, devised by Dr MacDonald, is a definite contribution to the production of a sodium salt of penicillin with high activity per milligram The final concentrate is passed through a Seitz filter, to render it sterile It is then dispensed aseptically into ampoules, frozen solid, and dried under high vacuum from the frozen state This gives a yellow-brown, somewhat fluffy powder which redissolves readily for injection Each batch is assayed for potency and tested for pyrogen and toxicity The product compares favourably with others on the market Clinical investigation of the penicillin produced in this manner has shown it

to be therapeutically active and clinically acceptable About fifteen patients have been treated with the Toronto penicillin to date and the results in some cases have been dramatic confirming the findings reported from other centres

Editorial Comments

National Immunization Week

The Health League of Canada, in co operation with Provincial and Local Departments of Health is conducting a "National Immunization Week" throughout Canada, beginning November 14 *The campaign is directed towards* the prevention of diphtheria smallpox and whooping cough In some Provinces the campaign will include scarlet fever This is an educational effort to inform parents particularly as to how they may protect their children against these preventable diseases of childhood

It is proposed to adopt this year a program similar to that of April, 1942, when a "National Toxoid Week" was held, but at the suggestion of the Provincial Health Departments, smallpox, whooping cough and scarlet fever, as well as diphtheria prevention are to be included Plans are underway for the distribution of 4-colour posters to every school in Canada These will be provided free of charge by the Health League of Canada as part of its educational program A manual of instructions for Health Officers in any part of Canada will also be prepared and distributed by the League Educational literature of the League, *i e*, pamphlets, street car cards or posters will be made available at cost price The support of the press and national magazines is, of course, essential to the whole plan and editorial support will be invaluable

The Toronto Diphtheria Committee of the League is acting as a nucleus committee, while the Deputy Ministers of Health of the Provinces although not named as actual members of the committee, are rendering the utmost co operation and will in effect constitute the general membership of a National Immunization Week committee It is timely to point out that the diphtheria mortality in the United States during 1942 was higher than it was in the two preceding years This is brought out in the annual report on diphtheria mortality in the *Journal of the American Medical Association* (August 14, 1943)

Medical Economics

PREVENTIVE MEDICINE IN THE NEW ORDER*

By F W Jackson, M D

Winnipeg

Just over fifteen years ago on September 10 1928, it was my duty and privilege to attend the meeting of the retiring executive of the Manitoba Medical Association, as a representative of the Brandon and District Medical Society I had been conducting a Health Survey within the Province under the auspices of the then first Minister of Health and Public Welfare for Manitoba the Honourable Dr E W Montgomery, and it seemed desirable to *bring to the members of the* Executive some of the impressions gained in the course of conducting the study After fifteen years of general practice in rural Manitoba, the thing that astonished me most in making my visits around the Province was the widespread public demand in many of our rural areas, for some more adequate and effective program of medical service, more particularly a demand in many instances that disease be prevented rather than illness cured

At that executive meeting I submitted a resolution suggesting that the Association should then appoint a permanent committee to study the provision of medical care, particularly in our rural areas, to try and meet some of the requests being made by the public However, the executive, after considerable discussion, decided that at that time it did not seem to be desirable that anything should be done Later in 1930 and 1931, following the meeting of the British Medical Association our Association, in conjunction with the College of Physicians and Surgeons did make a complete study of the total cost of medical care in Manitoba and the information gained in that study still forms the financial foundation upon which any new scheme of medical care for this Province can be built To the late Dr Harvey Smith, President of the British Medical Association in 1930, whose presidential address was about this very problem of more adequate medical care, must go the credit for this survey

The demand for a new order in medical care has increased year by year Many of the leaders of the profession in Manitoba, who have been placed in high and honoured positions in this Association by the votes of its members have realized the changing state of affairs They have in their presidential addresses, suggested and requested that the profession study the problem of medical care in order to try and prepare some plan or plans which would meet

* Presented to the Annual Meeting of the Manitoba Medical Association September 21, 1943

the growing demands of our citizens At least on one occasion a complete plan for Health Insurance was outlined by a president of our Association These requests, as I have said, have increased year by year, until now this new order in medicine is just around the corner

Although medicine in this Province is probably the most vitally interested group in any plan for a change in the present system of providing medical services, the medical men of this Province, with a few exceptions, have not shown a desire to grapple with the problem, despite the fact that during the last year, Dr Archer, our Past-President, has on many occasions urged all Divisions, in co-operation with other groups, to study the suggested legislation

Many other organizations however, have been studying the question, the most important of these being groups representing the majority of our people—the rural population I would like to refer you to many briefs on health and medical care prepared and circulated by the Manitoba Federation of Agriculture These give evidence of deep study of the problems involved and indicate the real trend in at least rural public thought During a month's speaking tour this spring, addressing district meetings of the Women's Institute, the same thinking was very evident In discussing the proposed benefits of Health Insurance, the real interest was in what the value of the plan would be in raising the general health standard of our rural people The dominating theme through all the material being distributed by rural organizations is the prevention of disease and the promotion of health Manitoba is an agricultural province and the desire of our farming communities must and will carry a great deal of weight with the thinking and action of our governing bodies, be they municipal, provincial, or federal

All political parties now have programs of social security, and this applies particularly to the three most prominent Federal political organizations In these programs, the most important item insofar as organized medicine is concerned is Health insurance

What is Health Insurance? I am sure that most of you, when you think of Health Insurance, regard it as a means whereby every individual in the community, especially those under a certain income level, will make payments to a common fund in order that *he* may employ *you* to provide the medical services which he requires We, in the Public Health field, and a considerable proportion of the public at large, look on Health Insurance from an entirely different angle We believe that it is exactly what the words imply, a plan whereby the maximum in good health may be *assured* to *every* individual in our community In other words, a plan to provide that all the known procedures in medical science having to do with health preservation and disease prevention, will be brought to all of our citizens

The implication, therefore, of preventive medicine in Health Insurance, forms the most important part of any new order for the provision of medical care As we see it, all those in the field of providing services under any type of plan set up by the Government in respect of medical care, must, of necessity, become more health-minded than they are at present, and must spend a greater proportion of their time in bringing to their clientele those preventive measures which are known, and have been proven, to be of value in raising the health standard of the individual and his community

It would seem under the present proposed plan of Health Insurance now under discussion at Ottawa, that, in the beginning at least, the great proponent of preventive medicine will be the general practitioner

What should his program be? We believe that it is too soon yet to set out in detail what every group amongst those providing the services under a Health Insurance plan can do in the preventive field However, we can outline in general what the family physician should do Those of us who are in public health work, and I speak with confidence for at least all Provincial Health Departments in this Dominion, are agreed that in the beginning of any plan the general practitioner should be the keystone of the preventive program He has the closest contact with the people of his community, and can and should be a medical adviser to his patients, more particularly for the prevention of disease than for the cure of illness His duties would commence in any given case with the complete control of pregnancy, with the supplying of all those pre-natal procedures which are agreed by organized medicine to be of value in the protection of the mother and her unborn child He should be responsible for the conduct of normal labour, with proper supervision of the mother in the post-natal period He should be required to provide, with consultive services supplied by pædiatricians and other specialists, including those in the public health field, the medical supervision of the life of a child from the time of its birth until it goes out into its own world, namely, starts to school

It should be his duty to see that all those procedures which we now know to be of value in the prevention of disease, are carried out amongst the children in his practice It would be necessary for him to co-operate as well with other groups in the Health Insurance services to have any defects found in children remedied before they start to school, and it should be his further responsibility to prepare for the school authorities a completed examination form showing exactly the physical, and where possible, the mental status of each child under his care I do not mean to suggest that these services are not now provided in some communities and by

some physicians. I am sure that at least all conscientious pediatricians give such services to the children coming under their care that is, when the parents give them a chance to do so.

Up until the present time, the greatest drawback in having the scheme as suggested brought into operation, has been the unwillingness of both individuals and community authorities to pay for medical supervision of apparently healthy children. As a result, it has only been the exception rather than the rule that such a service is provided. Under Health Insurance, however, and the proposal specifically implies that preventive medicine is the most important part of the plan, this service will be available and physicians will be paid for the work they do in this connection.

It would seem to us in the Public Health field, that once a child enters school, its supervision can probably best be carried out through a properly established system of school medical services under a local health department. It would appear that where children or individuals are grouped together, the most economical way of providing preventive service would be through special health services established for this purpose. However, as time goes on, more and more of this work must and should be turned over to the general practitioners, and the many specialists in the medical field.

Any new order in the provision of health services will ultimately require a new order in medical education, and it is very gratifying, I am sure, to all of us that through the efforts of the Dean of the Faculty of Medicine in our own University, Manitoba is well advanced in this connection. If the general practitioner is going to have to spend a considerable portion of his time in *practising* preventive medicine, then medical education must devote a considerable amount of its time to the *teaching* of preventive medicine. When I followed that much beloved gentleman of our profession, Dr Alex Douglas, as Professor of Preventive Medicine, one of the first things the Dean said to me was that there *must* be *increased emphasis* on the teaching of preventive medicine and Public Health. Fortunately, through the generosity of the Rockefeller Foundation, I was able, early in 1940, to visit most of the universities in the Eastern and Southern United States, and study the practices being used there in the teaching of these subjects. As a result of the report on these visits submitted to the Dean, there has been set up in the Faculty here a plan of teaching preventive medicine to undergraduates which, I believe, is superior to any in this Dominion. The Department of Health and Public Welfare has been glad to help in this project by giving leave-of-absence to our epidemiologist, Dr Max Bowman, to assist in the inauguration of this new program of social and preventive medicine. When the present set-up is fully in operation, the graduates from our medical school will be well-equipped to give the preventive services visualized in the proposed Health Insurance legislation.

I would like to point out to you that the medical services of our armed forces have realized the absolute necessity of a widespread integration of preventive medicine in all their activities. The Navy this year has a large group of medical personnel at the School of Hygiene in Toronto taking post-graduate work in public health. The Air Force and Army have at each of their commands and districts a specially qualified District Hygiene Officer, and to the Army goes the credit of having a special school on public health and preventive medicine at Camp Borden under the command of Lt.-Colonel Morley Elliott.

All medical personnel now joining the Royal Canadian Army Medical Corps are required, as part of their training, to attend this School. I am sure we all congratulate the powers-that-be, in the Army particularly, for these forward steps. Surely, if Preventive Medicine is desirable in the armed forces, it is absolutely essential for our civilian population.

One cannot consider any plan of Health Insurance without giving serious thought to its method of administration. All present indications point to provincial and local administration. This we think is logical. Medical practice is, and should be, a very personal thing between doctor and patient, so the closer administration is to the individual doctor and his patients, the better the plan will function. The methods of administration proposed by various groups should be common knowledge to all who read medical publications and it is not necessary to go into details on this subject. However, one must suggest that with the emphasis in the suggested legislation being placed on preventive medicine, there must be the closest co-operation between organized medicine and official health agencies in order to carry out the intentions of the proposals. How this can best be done would seem to rest with the Provincial representatives of three groups those providing the services, those who will receive them, and the government.

I would like to suggest that a study committee, as has been recommended by Doctor Archer, our Past President, be formed in the Manitoba Division of the Canadian Medical Association to carry on the work provincially which has been so well inaugurated at the Federal level by our parent organization, and that such a committee when formed, work in close co-operation with other organizations in our Province, so that as and when Health Insurance becomes a reality, a plan may be presented to the Government which in the opinion of those concerned will be a satisfactory one for all our people, medicine included.

In conclusion, I would like to suggest that organized medicine, must, in the new world we hope to have after the war, take more interest in our country's many social problems. Although

the practice of medicine in its many fields may be our primary interest in life, our aims cannot be properly fulfilled without consideration of and interest in all our country's welfare activities

Over sixteen years ago a forward-looking Government in Manitoba established partly as a result of the pressure of organized medicine, through its first committee on public health, a Department of Health and Public Welfare within the governmental activities of the Province That this was a wise move is indicated by the fact that since that time at least four other provinces have followed Manitoba's lead and have combined health and welfare under one minister The implications to our people of health and welfare cannot be separated Ill health in a family or a community often leads to social maladjustment, and social maladjustment usually leads to ill health

Organized medicine must in its own interests and in the interests of the common good, play a leading rôle in planning and carrying out any and all desirable schemes for so-called social security Let us accept then this challenge of good citizenship and retain what we have had in the past, that high privilege of being our communities' most honoured and respected citizens

Men and Books

PIONEER MEDICINE IN THE CHATEAUGUAY VALLEY*

By H R Clouston, M D, F R C P (C)

Huntingdon, Que

When I was first asked to address the Section of Pædiatrics of the Montreal Medico Chirurgical Society, I was almost overcome with diffidence at the thought of appearing before this body for which, in my heart of hearts, I have so much honour and respect However in my make-up there dwells an imp which more than once has launched me into cheeky enterprises and joyous adventure My imp reminded me that just 30 years ago now—at the mature age of 23 years—I was pædiatrician-in-charge at the Montreal General Hospital, "Of whom then shall I be afraid?" Dr A D Blackader, of sainted memory, on leaving for an extended trip West, said to me, his houseman, "You can do it as well as I can", and departed He actually asked another physician to come in some time to see that everything was all right This colleague came in after two weeks, was horrified about a case of tetany until I explained that it was not the same thing as tetanus, that Holt said that it was not fatal, but seemed to be associated in some way with the parathyroids and calcium metabolism, but no one had proved just what it was That was in the era B C—before Collip I was told that I was to carry on—that he didn't know anything about kids The babies' ward was an appendage of the adult medical wards The junior medical houseman was the intern of the babies' ward A pædiatrician was chiefly a baby feeder and a measles expert

As pædiatricians you are interested in the Chateauguay Valley as the largest and best source of milk for Canada's largest city You know that this was the first area in Eastern Canada to have all its cattle free of tuberculosis That fact alone would indicate that the inhabitants are a progressive and enlightened people High standards of medicine and sanitation are reflected in low death rates High standards of living are shown by good buildings, so well kept up that often the soldiers who come to our military camp from other sections ask if there is a law requiring us to keep our buildings painted We have an unusual percentage of improved roads and an extraordinary auto registration The Town of Huntingdon has the largest rural telephone exchange in Canada and is dial operated For 20 years we have had filtered and chlorinated water, for 90 years, an outstanding high school, for 80 years a weekly paper recognized as one of the best in Canada, with a splendid publishing plant Its founder was a true research historian who comforted himself with the foreknowledge that some day his long efforts would be appreciated

I am afraid that some of you think that we are in the Eastern Townships Now the Eastern Townships have the hills to which you may lift up your longing eyes somewhere east of the Richelieu We have the green pastures beside the still waters The map shows that practically all the land between the Richelieu and the St Lawrence is drained and watered by the Chateauguay and its tributaries

The Children's Memorial Hospital nestles in the upper part of the south east slope of an extinct volcano which you call Mount Royal From its tower with the mountain behind you you can see 40 miles southward to the mountains of the Adirondacks at whose base runs the American boundary east and west along the line of 45 To the east the river of the Iroquois runs straight north and after passing between two more extinct volcanoes, joins the St Lawrence at Sorel In the foreground is the "River without End" of the Indians forming the hypothenuse of a right-angled triangle Directly in front of you are the current and rapids which stopped Cartier on what he hoped was the way to China—LaChine This current of St Mary and rapids of St Louis are the reason for the city of a million people which lies at your feet, now musing on its 300th birth

* Address at the Annual Dinner of the Section of Pædiatrics, Montreal Medico Chirurgical Society, Montreal, June, 1942

day and wishing that circumstances would *permit its fitting celebration*

If I had the time and you had the patience, I could prove to you that no vista in America excels this one in historical interest and military importance It is the Belgium of America and more than once the fate of half a continent has hung on decisions taken in the plains which lie within your vision The very first Canadian Expeditionary Force went up the Richelieu The first United States Expeditionary Force came this way in 1776 About 129 years ago American soldiers cut out of the bush what is now the main street of Huntingdon and Highway No 4 to Ormstown The last attempt on Montreal was stopped at Trout River in 1870 On that occasion Dr Blackader was medical sergeant—as a third year student

For many years after the British took over the infiltration of settlers was gradual from the United States and Britain The War of 1812 14 was not a total war, but one of governments Civilians of the United States smuggled up potash which our people sold in Montreal for them Liquor was scarce in the States, so our people smuggled it down British troops in their fight with the American troops had only the wilderness behind them They were short of meat Therefore American cows were smuggled in to feed the British troops Cattle-smuggling and rum-running are not innovations in our district

After the Napoleonic wars came an influx of settlers, largely from Scotland They came in small ships which usually took six weeks for the journey The small size is illustrated by an incident of my grandfather's trip in the middle of the century The ship was wrecked, ran aground at high tide at midnight, near L'Islet, just below Quebec In the morning when the tide was out carts came alongside and took off those on board Ships were lighted by candles, hung in gimballs so that they might always retain an upright position

Their first houses were of logs and were 12 × 12 or 12 × 18 The log ends were cut on a ¼, ½, ¾, ½, basis, so that when fitted together the logs clung together without nails or pins The roof was of bark with the natural curve preserved and the edges overlapped to be rainproof There was a fireplace at one end, the lower part was of stone but the upper chimney part was made of cedar poles plastered inside and out The plaster was made from lime obtained from the shell lime stone which was so common Many farms show these old lime kilns today The houses were very small, but if the Army Manual is correct in saying that a fireplace with a 9-inch flue will draw 20 000 cubic feet of air per hour then these houses would be very draughty and certainly not stuffy These fireplaces could change the air in a house of that size ten times an hour and a change of over three times an hour causes a draft In many places there were no floors at all In some they used basswood slabs split from the logs Sawn boards were extremely scarce One man with great labour obtained some from a mill in the United States for a loft One by one again they were taken up to make coffins The beds were sacks of leaves at first later came corn husks, which are frequently used yet I confined a woman on one while preparing this article When they got fancy they had bedsteads with wooden knobs for ropes to support the ticks

At first the settlers did not know enough to prepare their firewood a year in advance not to use the hard wood for fuel instead of the soft They had no matches so they had to be careful to keep fire Otherwise, they had to go some distance to borrow some from a neighbour or use a flint and steel or a piece of punk or a bit of cotton shirt-tail fired from a musket Candles were made from deer fat

Food was plentiful and satisfactory Their wheat was roughly ground and the vitamins were left in Potatoes in the new land often ran 400 bushels per acre Fish were plentiful in summer or winter This past winter I saw four bushels of perch obtained through the ice by one man in one day They soon had real pork but at first bear was "bush pork" Deer travelled in herds Wild fowl were so numerous that stories of them would be incredible if they were not so well authenticated Wild pigeons were netted and salted down in barrels

There were wild beasts—wolves and bears—but these gave little annoyance Food was plentiful for them without bothering man One man tells of an experience with bears He heard trampling in the dry litter behind him and saw two bears approaching him He says "The advice given me by Sandy Williamson for such a contingency flashed into my mind and I bent my head until I could look between my legs and began dancing and capering The brutes looked at me for a moment or two and then affrighted by the strange spectacle turned and fled" This same man tells how he got off the track one time and "so desolate was the scene and so hopeless looking the prospect of finding a way out that the very dog that was with me sat down at the foot of a tree and howled"

In the early days the settlers did not live by agriculture but by wood-burning Clearing the land was but incidental to obtaining money from potash or crude potassium carbonate washed out of the ashes obtained by burning the forest Each settler could make two or sometimes three barrels in a year and as it was worth $30 to $40 per barrel the amount was of great consequence In some places asheries were built which bought ashes at 12 cents a bushel The amount of labour entailed in burning the green wood can scarcely be imagined

The greatest suffering of the settlers was due to lack of clothes Their clothes became wonderful pieces of patchwork until they obtained sheep and spun their wool

Obviously only a selected group, young and healthy, would go into such pioneer work Obviously also, a sparse, young, healthy population with no roads and no money, did not offer a promising field for medical practice The people had to depend on themselves and their neighbours I have here a book brought out by one of the pioneers It is a fifth edition of Culpepper's *Compleat and Experienced Midwife* Glasgow, 1751

I do not present it as the best authority of the day but it was the book brought out by these people in the days when everything that was printed in a book was sacred

It gives the anatomy, physiology, physiology of reproduction together with obstetrics, pediatrics and gynaecology It contains much wisdom and also a great deal of curious misinformation For example in the early chapter on anatomy it says

"The mouth of the womb may be dilated and shut together like a purse, for although in the act of copulation it be big enough to receive the glans of the yard, yet after conception it is so close shut that it will not admit the point of a bodkin to enter, and yet again at the time of the woman's delivery it is opened so extraordinarily that the infant passeth through it into the world"

Apparently there was considerable dispute as to the part of the women in reproduction, whether they emitted seed The women believed yes, our author says No, but quite generously he adds "I will not therefore go about to take any of their happiness from them but leave them in possession of their imagined felicity"

Twelve signs of conception are given Among them are

If a woman have been more than ordinary desirous of copulation and have taken more pleasure than usual, it is a sign of conception

If under the lower eyelid the veins be swelled and appear clearly and the eye be something discoloured it is a certain sign she is with child, unless she have her menses at the same time upon her Or that she has set up the night before This sign has never failed

Some make this trial of conception They stop the woman's urine close in a glass vial for 3 days and then strain it through a fine linnen cloth, and if they find small living creatures in it they conclude that the woman has certainly conceived

This is another early trial Let the woman that supposes that she has conceived take a green nettle and put it into her urine, cover it close, and let it remain therein a whole night If the woman be with child it will be full of red spots on the morrow, but if not with child it will be blackish

In dry difficult labours there were herbs with a reputation, dittony, juniper, bettony, feverfew boiled in white wine, tansy But it is added

"The stone etites held to the privities is of extraordinary virtue and *instantly* draws away both child and afterburden, but great care must be taken to remove it presently or it will draw forth the womb and all, for such is the magnetick virtue of this stone that both child and womb follow it as readily as iron doth the load stone or as the load stone doth the North Star"

The stone etites is the eagle stone which the eagle was supposed to carry to its nest to assist in hatching its eggs It is a stone which rattles as if there were another within it, those nodules, found abundantly in carboniferous strata, which are hollow in place of solid or have what was once a cavity filled up with clay ironstone in a pulverized state Thieves could be discovered by its aid and it caused love between man and wife

Quite disdainfully, Culpepper says that there are many other things that physicians affirm are good in this case, among which are an ass's or a horse's hoof hung near the privities, or a piece of red coral hung near the same place A lode stone held in the woman's left hand helps much or the skin which a snake has cast off girt about the middle next the skin, but these things are not certain, though quoted by Mizaldus

In obstetric operations the midwife was warned to take the rings off her fingers The hands were to be anointed with fresh (*not* salted) butter Various manipulations are described, good enough in themselves, but with no thought of infection and of course no anæsthesia One's heart goes out to the author when he complains of the directions of some writers about external version He cries that "those who have thus written are such as never understood the practick part"

We are told that "new-born children are subject to so many distempers that there are not above half the children which are born that live until they are three years old, *i.e.*, about 500 per 1,000"

Garrison tells us that the infant mortality rate at this time was appalling At the Dublin Foundling Asylum 10 272 children were admitted from 1775 to 1796 Of these only 45 survived—a mortality of 996 per 1,000 A child either had to nurse or die The hired wet nurse had her palmiest period at this time, usually getting 25 guineas a year or 10 a quarter, which was very high pay In order to make money in this way, young unmarried women deliberately had illegitimate children, who were destined to die through baby farming or in the Foundling Hospitals In England the wet nurse became a tyrant in the household until she was put out of business by the nursing bottle

The earliest substitute for mother's milk was water pap, made of boiled bread or baked flour moistened There was also oatmeal, cowslip tea, boiled barley or star of anise in milk, and German beer soup came into use The original sucking bottle was a cow's horn, 1783

Nipples were made successively of parchment, leather, sponge, but the most successful seems to have been a heifer's teat, kept in spirit Sometimes, if the mother had difficulty in nursing the baby a neighbour could help out I imagine that this was more likely to happen

under pioneer conditions where mutual poverty and difficulty made people more kindly In our area the mother of a well known colonel (a C M G of the last war) was usually nursing one child and frequently took in another (she had had 3 sets of twins of her own) The Scots believed that the principal formula for raising a baby was "Keep its mouth wet and its butt dry"

The nursing baby of course had its vitamins provided For the children who survived there were ample vitamins A from fish and fish oils Salmon and other fish were plentiful Carrots *raw and cooked* B One of the complaints of the early settlers was that the grain was so poorly ground and often the only sifting was done by themselves *They* got the elements *which we are now attempting to restore to our* food C, probably the main source was potatoes *I presume that then as now when mother* was peeling the potatoes the creeper and toddler was given a piece to eat his teeth on and baby liked it

Cartier in 1534 cured scurvy in his crew with an infusion of white spruce I and other children have relished the tender spruce tips in spring time Those who believe that children will select the necessary foods, may find some support in this Grass is known to be a good *source of vitamins and children of all ages pull* and eat the soft stem of the various grasses—*the stem of the daisy and dandelion* There was no spinach, but there was any quantity of the marsh marigold or cowslip which is similar in appearance and by some preferred to spinach

The barefoot boy was not short of vitamin D *for half the year but I am afraid that the Scot* considered a certain amount of rickets as *normal*

Vitamin E, the antisterility vitamin was certainly not removed by the wheat-grinding process the families were large As a matter of fact people in those days were much more interested in fertility than in contraception

Culpepper pays a great deal of attention to barrenness He says that in females it was sometimes due to letting blood in a virgin's arm before her courses come down If bleeding be done it must be done in the foot In males it was due sometimes to cutting the veins behind the ears which in the case of distempers is often done The seed flows from the brain by those veins behind the ears more than from *any other parts of the body*

If you would know whether the fault is in the man or the woman sprinkle the man's urine upon one lettuce leaf and the woman's upon another and that which dries away first is unfruitful

The various causes of sterility were treated differently of course For example

> 'If barrenness be occasioned by the falling out of the womb as sometimes happens, let her apply sweet scents to her nose and let her have stinking things to the womb such as the stock of her own hair etc., for this is a certain truth that the womb flies *from* all stinking and *to* all sweet things But the most infallible cure in this case is this — Take a common burdock leaf Apply this to her head and it will draw the womb upward—apply it to the soals of her feet and it will draw it downward Even burdock beaten into a light powder has the same virtue It draws the womb which way you please according as it is applied
>
> But if the cause of barrenness be through the scarcity or diminution of the natural seed these things following increase natural seed'

I may say that to my father some of these things would be horrible but to a generation which calmly uses an extract from the urine of pregnant mares and placental extracts they may be of mild interest

Medically and surgically the pioneers were as well off as those at home, and had far less need of treatment Only the young and healthy came out The weaker ones, the aged and the tuberculous, were self eliminated

Laennec was inventing the stethoscope just as the pioneers were leaving Britain for Huntingdon (1819) but neither stethoscope nor clinical thermometer was used for many years after they landed here Obstetric cases were safer in huts in the backwoods than in some of the fine hospital buildings in the old country which for about 10% were the gate of heaven As for surgery, our pioneers were as safe in the valley of the Chateauguay as in the valley of the Thames or the Clyde There were no antiseptics and no anesthetics There was no knowledge of infection, of serums and vaccination had great dangers Smallpox was a recurring scourge Thomas Jefferson who composed the American Declaration of Independence, in a letter dated July 1st 1776 says that one of the reasons that then affairs were going retrograde in Canada was that one half of the army was still down with smallpox at Isle Au Noix

Chills and fever—ague—are frequently reported Whether this was really malaria is open to question However as the whole area was a mosquito swamp it may have been There was suffering "if they did not have the bark" Typhilis and perityphilis—commonly known as inflammation of the bowels was a very serious disease The death rate in it was probably about 40% but you are very young if you do not remember when we regarded with equanimity a death rate of 40% in inflammation of the lungs

The greatest help was the *Vis Medicatrix Naturæ* and there was more of it here than in most places There was goose oil or duck oil to rub into chests and skunk oil for all sprains and sore places The roadsides are now covered

with Sanguinaria Canadensis — bloodroot — which is a standard ingredient of syrup of white pine as an expectorant It also is said to be an emmenagogue The buttercup crushed and rubbed in is said to act like mustard Wintergreen (methyl salicylate, natural) from the blueberry swamps and rocks was used internally and externally for rheumatism Combined with garlic and rubbed all over the body it was supposed to cure appendicitis Gold Thread was good for sore mouths and was the equivalent of gentian as a stomachic An infusion of choke cherry bark was a bitter tonic Pine gum on cloth or paper was good for a sore back We have some sulphur springs whose waters are good for whatever sulphur waters are good for Spruce gum in high wines was and still is a prescription for coughs Cow manure poultices were in order for certain sores and inflammations Its use has died out within my memory

I have known of a young man of the type referred to by a writer recently as a "barnyard male" who applied to an old woman who was an "experienced nurse" for a treatment for an alleged ringworm of the face The old girl knew that in reality it was a bite administered to him by a young woman who resented his too ardent attentions She suggested a poultice of feces tauri

Some of these old women were intensely practical I knew one of them to use hydrotherapy for hysteria successfully A pail full of cold water thrown over the young woman brought her to her senses very rapidly

Opium was either brought out or was available There were no narcotic laws and it could be bought in grocery stores There is of course no drug yet which would be more acceptable if one were restricted to one drug only

I am afraid that the usual cure all was one on which it is said they still depend in outlying districts of Scotland When asked what was used under certain circumstances the reply was "We gie him a glass of whusky" "But if that does not do?" "We gie him another glass of whusky" "But if you give him all the whiskey he can hold and he does not get better nor wi' ony do?" "Weel, a mon whit'll the savin" whusky is no worth

I am not sure but that we waste our sympathy on the pioneers They were landlords, free of taxes, and they were free of equal and dependent on each other We were all returning to many of their ways Cigarettes are lighted with a flint and steel, we are going back to whole wheat bread, they made a drink from toasted grain,—some of us drink Postum They had no rubber and we are getting into the same position

There is a great satisfaction in seeing wilderness become good land under your labour I too have pulled stumps and raised stones Robert Sellar tells us that he talked to hundreds of these pioneers They all agreed with one exception, that they were happiest when at their beginnings and before prosperity and accumulation brought jealousies, etc Perhaps this was due to their youth, a French philosopher says that the only Heaven is youth Perhaps they agreed with Benjamin Franklin who contradicted a writer who referred to "the happiness we enjoy beyond what is attained by solitary savages"

"The difference is not so great as may be imagined" Franklin wrote "Happiness is more generally and equally diffused among savages than in our civilized societies No European who has once tasted savage life can afterwards bear to live in our societies The care and labour of providing for artificial and fashionable wants, the sight of so many of the rich wallowing in superfluous plenty whereby so many are kept poor and distressed by want, the insolence of office, the snares and plagues of law, the restraints of custom, all contribute to disgust them with what we call civil society"

"Never put a baby's clothes on over its head or cut its hair before the twelfth month or its fingernails before the sixth month" is an example of the advice offered to mothers in the more remote sections of the United States, which is cited by L W Bryce, Roncevorte, W Va, in *Hygeia, The Health Magazine* for June is a part of the vast store of homespun medical preventives and treatments accumulated in such communities through generations Such superstitions, which he calls "granny medicine", are found in many sections of our own country as well as in other so called "uncivilized" places

"All of us are familiar with the less bizarre forms of granny medicine Grand dad always carried a potato or buckeye in his pocket to ward off the twinges of rheumatism Many persons wore a black cotton thread tied about the neck to prevent croup

'Back in the hills you will learn that a sty on the eye will quickly disappear if rubbed with a gold ring

"A red string worn about the little finger is said to check the tendency to nose bleed If this should fail, a necklace of red corn kernels will always do the trick. It is also well to know that a key dropped down the back is useful in stopping a nasal hemorrhage that is in full swing This failing, a silver coin held under the upper lip is more potent

"A piece of red flannel into which are stuck five pins is supposed to prevent measles, whooping cough, scarlet fever, chickenpox and mumps The piece of cloth so prepared is simply laid under the child's bed

"For manual workers granny prescribes a wristlet of leather, if possible a part of a discarded horse harness This prevents sprains and strengthens the wrist And it is a well known fact among grannies that a nail wound will never cause lockjaw if the nail is well greased with bacon fat and carried in the pocket until the wound is healed No history of granny medicine is complete without mention of treatment of sterility in the female The midwife hands a naked new born babe to the barren woman saying, 'Within a year you'll be holding one of your own' It is surprising how frequently the remedy works!"—L W Bryce, *Hygeia* for June, 1940.

CATECHISM IN MEDICAL HISTORY

By Heber C Jamieson, M B, F R C P (C)

Edmonton

QUESTIONS

1 What scourge of the tropics was eradicated by an American physician who had a nine months' course in Medicine?

2 Six clues over a period of eighty years led to the detection of the culprit in yellow fever Can you give them?

3 Moliere burlesqued, with violins playing the graduation ceremony of French doctors What gave him the idea?

4 In literature frequent references have been made to the disagreement of doctors Mention three such

5 What ancient Greek obstetrician and pediatrician introduced a simple method for testing the quality of milk?

6 What disease has been called "Tornado", "Death of a dog", "Ganglionic Tetanus", and once classed as a neurosis? It invaded Canada in 1832

ANSWERS

1 Yellow fever Walter Reed, after a nine months course at the University of Virginia, graduated before he was seventeen, third in his class In 1900 by a series of experiments he proved conclusively that the female *Aedes Aegypti* mosquito was the sole carrier of the organism of "Yellow Jack"

2 (1) During an outbreak of the disease in Spain in 1821, an English surgeon wrote "It is worthy of note that during the month (July) the flies and mosquitoes were infinitely multiplied"

(2) In 1819 in Alabama it was observed that sailors employed about the wharves and on a schooner filled with stagnant water were the first to be stricken

(3) The high and dry parts of the cities where it was endemic were the last to be affected In many epidemics the people fled from the low-lying sections and the disease then spread to residents in the higher sections

(4) Some observers noticed that the disease spread in the direction of the prevailing wind

(5) Yellow fever flourished when the weather was hot and died down when frost came Mosquitoes were also active in hot weather and disappeared after a frost In 1881 Dr Carlos J Finlay of Havana advanced the mosquito theory Now we had a suspect

(6) Dr Walter Reed in 1900, gave the third degree to the suspect (*a*) Eleven persons allowed themselves to be bitten by mosquitoes that had bitten patients with yellow fever Two developed it (*b*) Reed proved that fomites long considered a cause were innocent Volunteers slept in beds with sheets and blankets soiled by the excreta of yellow fever patients None took the disease

3 John Locke an English philosopher and physician describes in 1676, a visit to the graduation ceremony at Montpellier This is his description

"The manner of making a doctor of physic was this the procession, in scarlet robes and black caps the professor took his seat and after a company of fiddlers had played a certain time he made them a sign to hold that he might have an opportunity to entertain the company, which he did with a speech against innovation the musicians then took their turn The inceptor now began his speech wherein I found little edification being designed to compliment the chancellor and the professors who were present The doctor then put on his head the cap that matched in on the beadle's staff in a sign of his doctorship put a ring on his finger girt himself about the loins with a gold chain made him sit down beside him that having taken pains he might now take ease and kissed and embraced him in token of the friendship that ought to be amongst them"

4 (1) "Who shall decide when doctors disagree"

(2) "If you want to rid yourself of an enemy
Do not seek assassins
Give him two doctors
And let them be of contrary opinions"
—Pellisson

(3) "If your physician do not think it good for you to sleep to drink wine or to eat such and such meats never trouble yourself I will find you another that shall not be of his opinion the diversity of medical arguments and opinions embraces all sorts of methods"
—Montaigne

5 Soranus about 146 B C placed a drop of milk on his finger nail and by inspection decided if it were suitable It has been claimed that fully 50% of his teachings in pediatrics are sound today

6 Cholera (from the Greek word for bile) This is also a misnomer since the dejecta are free from bile

Medical War Relief Fund

Individual subscriptions from August 20th ... $1500

The General Secretary's Page

The annual meetings of the four Western Divisions which were held in September were the most largely attended in their history

War medicine, health insurance and the need for a breather away from duties which have become increasingly heavy during recent years no doubt played important rôles in the large registration Then, too, the fact that the parent body did not hold a scientific meeting this year may also have had some bearing upon the attendance

The travelling team which visited the four meetings consisted of Doctors D Sclater Lewis, President of the Canadian Medical Association, Gavin Miller of Montreal, William Boyd and Ray Farquharson of Toronto, and the General Secretary Each meeting was marked by the attendance of a relatively large number of enlisted medical officers It was splendid to see so many of them present and a fine tribute to their desire to keep strictly up to date Some of the duties devolving upon military medical officers do not offer opportunities for the development and advancement of professional skill, while many find themselves engaged in administrative and other work which has taken them away from the practice of scientific medicine It is not surpassing strange that these colleagues feel the need of refresher courses Judging by the many comments one heard, the four Western meetings would have been fully justified if they had been arranged for no other purpose than to present opportunities for scientific refreshment of medical officers of the three services

Dr Howard Spohn, of Vancouver, presided over the British Columbia meeting which was held in Vancouver on September 8, 9, and 10, with a medical registration of 502 He was ably assisted by an active committee, but it is not invidious to say that the ubiquitous and indefatigable Executive Secretary, Dr Morris Thomas, was everywhere and in everything, seeing that all the wheels turned smoothly and without friction and fuss The registrants were loud in their praise of the program which they said was one of the best ever The fellowship of the meeting was delightful, the weather perfect—British Columbia at its best—and the meeting in every respect an unqualified success

The team moved on to Calgary for the meeting of the Alberta Division on September 13, 14, 15 Gorgeous prairie sunshine and that delightful autumn air for which the West is so famous presented a perfect setting for a three-day conference which flowed smoothly and happily under the direction of President D N MacCharles of Medicine Hat, ably assisted by his two stalwart cohorts, Dr George Johnson and Mr W G Hunt Once again, the program appeared to please and satisfy the 224 members who had the good fortune to be present

In passing, one cannot help but compliment the Canadian Society for the Control of Cancer for the Cancer Week program which had been arranged for Calgary and which was in full swing while we were there Close upon 1,000 people attended a public meeting to hear Dr William Boyd speak on cancer, and the various service clubs, church organizations and other bodies were holding meetings through the week to listen to prominent speakers on the subject Alberta is doing a magnificent job in the cancer field and to Dr J S McEachern and Dr W H McGuffin of Calgary must go much of the credit for what is being done

Regina was host city to the Saskatchewan meeting on September 16, 17, 18 Again, the scientific program was received with high praise by the 276 members who registered President M H McDonald, of Weyburn, and the spry young Secretary, Dr A W Argue who will shortly celebrate his 80th birthday, conducted the business sessions with conspicuous tact, judgment and parliamentary acumen The spirit of the meeting was maintained at a high level throughout, due in no small measure to the delightful hospitality afforded by the hosts

On Sunday, September 19, the team moved on to Winnipeg and were guests of President F K Purdie at dinner that evening, as a prelude to the three-day conference on September 20, 21, 22 A registered attendance of 345 set another record The comments one heard about the program were very similar to what had been said before, namely, that the papers were practical, informative and exceedingly well presented

The team departed from Manitoba with very happy memories of four delightful meetings, well organized, well conducted and plenteously interlarded with hospitality and kindness

I would like especially to say something about the business sessions at all four meetings Obviously, the question which was uppermost in the minds of the members was health insurance It was very apparent that the medical profession of Canada, or at least the more than 1,300 who attended the four meetings were most anxious to know the facts about the proposed health insurance acts, their implications and the possible effect upon the future practice of medicine in Canada Vancouver had a Round Table on the subject, extending over a period of nearly four hours, with interest sustained until close upon midnight Calgary did the same Regina devoted two sessions to the subject, while in Winnipeg, it unquestionably

was the major topic of interest at the business meeting But, while the four Western Divisions are deeply concerned with health insurance, they displayed a keen interest in all the other activities in which the Association is engaged in preserving and protecting Canada's health Western Canada has every right to be proud of its medical profession

Divisions of the Association

Alberta Division

The annual meeting was held at the Palliser Hotel, Calgary, on September 13, 14, and 15 1943 There was a record attendance of two hundred and fifty officers of the Air Force Army and Navy and members of our Association The representatives of the Canadian Medical Association contributed in great measure to the success of the meeting These were Dr Selater Lewis, Professor of Therapeutics, McGill University and President of the Canadian Medical Association, Dr William Boyd, Professor of Pathology, Toronto University, Dr Gavin Miller, Assistant Professor of Surgery McGill University, Dr R F Farquharson, Assistant Professor of Medicine Toronto University and Dr T C Routley, General Secretary of the Canadian Medical Association Also contributing were Colonel W P Warner R C A M C, Lt-Col J D Griffin, R C A M C, Major J A L Walker and Major Walter Somerville R A M C The addresses, papers and round table conferences were of exceptional interest During this, the fifth year of the war, we had not expected to hear addresses and papers of such merit We are from year to year greatly indebted to the Canadian Medical Association for the happy choice of the personnel of each team sent to us men of high standing in our profession This year we were especially fortunate

Those who spoke at the three luncheon meetings were Dr T C Routley Professor D Selater Lewis and Professor William Boyd

A public meeting was held at Central United Church where Professor William Boyd gave an address on cancer Dr J S McEachern also spoke on the same subject to the members of the Kiwanis Club

Members of the Royal Army Medical Corps and of the Royal Canadian Army Medical Corps contributed notable papers which were relative to military subjects

The proposed Dominion Health Insurance plan was discussed from various angles when the greater part of one evening was devoted to this subject Our members voted in favour of the proposal that some suitable body possibly the Canadian Medical Association Procurement and Assignment Board should have the power of a war measure to keep physicians in their present locations and to move them to areas where they are most urgently needed It decided that if and when Health Insurance was adopted it should include everyone but is opposed pre selection of the family physician before the services were needed There should be a free choice of doctor by the patient and patient by the doctor

The Convention favoured the Royal College of Physicians and Surgeons of Canada as being the body to designate who were to be called 'specialists'

Owing to the fact that many physicians had left the direct areas of the province the Council of the College of Physicians and Surgeons of Alberta decided to rearrange the rural constituencies so that the number of voters in each district would be more nearly equal The cities of Edmonton and Calgary were not altered, each having one member on the Council as formerly

At the general meeting of the Canadian Medical Association Alberta Division the following officers were elected *President*—Dr J Lester Clarke Didsbury, *President Elect*—Dr H H Hepburn Edmonton, *Librarian*—Dr Heber C Jamieson Edmonton, *Honorary Secretary Treasurer*—Dr George R Johnson Calgary

The social program for the visiting doctors' wives included afternoon tea at the Glencoe Club reception by the President and Mrs D N MacCharles in the sun room Palliser Hotel and dinner at the Ranchmen's Club

Ideal warm sunny weather prevailed when the golf tournaments were played off at the Calgary Country Club in competition for the Late Dr George A Kennedy Memorial Cup and for the McEachern Cup The former was won by Dr A E Fettes and Dr J K Mallov who tied in the game The latter cup was won by the Calgary in competition with the Edmonton physicians G E FRAMONTH

British Columbia Division

At the annual meeting of the British Columbia Medical Association the following were elected to office *President*—Dr P A C Cousland Victoria *First Vice-president*—Dr A Y McNair Vancouver *Second Vice-president*—Dr A H Menely Nanaimo *Honorary Secretary Treasurer*—Dr G O Matthews Vancouver and five *Directors at large*—Drs G F Amyot J S Daly C H Hamilton H H Milburn and G A C Roberts J H McDERMOT

Manitoba Division — The Annual Meeting

The annual meeting of the Manitoba Division of Canadian Medical Association was held in the Royal Alexandra Hotel Winnipeg September 20 21 22 Considering that this is the fifth year of war the meeting was most successful We are indebted to our visitors from the east Dr D Selater Lewis Montreal President of the parent body Wing Commander R F Farqu

haison, R C A F, Toronto, Dr William Boyd, Toronto Dr Gavin Miller, Montreal, and Dr T C Routley, General Secretary, C M A, who can claim all Canada as his home These gentlemen were untiring in their efforts to enliven and enrich the meeting both through their scientific contributions and their public addresses

The meeting may properly be said to have begun on September 19, when the president, Dr F K Purdie, Griswold, gave a dinner to the executive of the Division Mayor Garnet Coulter and Hon James McLenaghan, Minister of Health and Public Welfare, welcomed the members of the Division to Winnipeg

The election of officers at the annual business meeting resulted as follows *President*—Dr D C Aikenhead, Winnipeg, *First Vice-president*—Dr S D Schultz, Brandon, *Second Vice-president*—Dr P H McNulty, Winnipeg, *Honorary Treasurer*—Dr W G Beaton, Winnipeg, *Honorary Secretary*—Dr D L Scott, Winnipeg, *Members at-large of the Executive*—Dr J R Martin, Neepawa and Dr A Hollenberg, Winnipeg Dr Aikenhead is Chief Anæsthetist, Winnipeg General Hospital and Lecturer in Surgery (Anæsthetics), Dr Schultz is Superintendent of Brandon Mental Hospital, and Dr McNulty is head of the McNulty Clinic and a member of the surgical staff of St Boniface Hospital

The executive committee reported that a schedule of fees had been approved for general practitioners and specialists It is based on the standard of medical services in 1943 and the price fabric prevailing in this year

Improvements in the present curriculum of Training Schools for Nurses in Manitoba were recommended These recommendations will be forwarded to the Minister of Pensions and National Health, the President of the University, and the Secretary of the Manitoba Association of Registered Nurses

The committee on economics regretted that the plan for voluntary contributory health insurance, Manitoba Medical Service, had not come into operation, especially in view of the possibility of National Health Insurance The plan, if in operation, would have shown the difficulties which will be many, and how best they can be surmounted

The extra-mural committee reported meetings of the Brandon District Medical Society, December 10, 1942, North-Western Medical Society, August, 1942 and June 9, 1943, and a combined meeting of these societies on July 31, 1943

The maternal mortality committee reported 15,362 live births in Manitoba in 1942 with 39 maternal deaths, a maternal death rate of 2 4 per 1,000 Toxæmia headed the list as cause of death

The public health committee reported many significant advances to improve public health facilities Milk supervision for Greater Winnipeg will be taken over from the provincial authorities by the City of Winnipeg Health Department This department has also set up a Division of Tuberculosis Control and is conducting surveys among various industries and other groups within Greater Winnipeg A complete reorganization of control efforts against venereal disease has been effected A minimum standard of public health services for rural Manitoba has been set up Postgraduate courses in nursing have been established under the auspices of the University The Department of Health has loaned Dr M Bowman, Provincial Epidemiologist, to the Faculty of Medicine to assist in the teaching of Public Health and Preventive Medicine The Hospital Committee has almost completed its task and its report will be presented to the Government in the next few months A start has been made in the field of industrial hygiene to limit the hazards of wartime production

The National Contributory Health Insurance Committee presented a blue print of the ideal services to be rendered by physicians, nurses, hospitals and medical schools As the committee was not in complete agreement, especially on the question of closed and open medical staffs, the report was referred to the committee for further study

The membership committee reported a substantial increase in paid-up membership

The education committee recommended that the accelerated program of medical studies should be terminated as soon as it is possible to do so As at April 15, 1943, a total of 442 graduates of Manitoba Medical School had entered the armed services This equals over 26% of all its living graduates

The public meeting under the chairmanship of Dr Purdie in Grace Church on September 21 was well attended Dr Selater Lewis and Professor William Boyd gave interesting addresses on "The Medical Profession and Social Security", which was the subject later of an editorial in the *Winnipeg Free Press*, and on "What We Should Know about Tumours"

Dr T Harry Williams, Pathologist in West China Union University, Cheng-Tu, and now of the staff of the Winnipeg General Hospital, had a most informative exhibit on Tropical Medicine

The commercial exhibits were well displayed and formed a valuable part of the program

The wives of the members were entertained at luncheon by Mrs F K Purdie, and at an evening gathering by Mrs H D Kitchen

Clinical programs were presented on the first two afternoons at the Winnipeg General Hospital and St Boniface Hospital

The annual golf tournament was held at the Niakwa Country Club on the afternoon of September 22

The Manitoba Health Officers Association has been affiliated with the Manitoba Division of the Canadian Medical Association and will be represented by a member on the executive committee

All in all the annual meeting represented much work on the part of committee members and proved the vitality of Manitoba medicine.

Ross Mitchell

Saskatchewan Division

The Saskatchewan Medical Convention ... exceptionally well attended ... all previous records, over 250 medical men registered ... at the Hotel Saskatoon ... September 16, 17 and 18. ... [illegible]

[illegible]

... Medical Services ... Dr. ... Brown, of Moose Jaw, ... [illegible] ... Dr. ... Dr. ... Dr. ... Committee of ... [illegible]

... Dr. ... Mr. McNeil and Dr. ... Mr. W. ... [illegible] ... on different ... of the Regina and District Medical Society ... banquet on Thursday evening. Dr. ... one of our veteran members ... the doctors assembled at the banquet ... of early Saskatchewan medical history.

A joint meeting of the Western District Medical Society and the South Eastern Saskatchewan District Medical Society was held in the Chalet at Lake Kenosee on August 27 with 26 doctors attending.

Dr. M. R. MacCharles, of Winnipeg, gave a very interesting and instructive address on "Cancer of the breast", and Dr. D. S. MacKay, also of Winnipeg, gave an excellent address on "Bleeding from the genital tract".

Dr. R. O. Davison, of Regina, discussed and explained the Provincial regulations regarding isolation for tuberculosis. Dr. H. C. George, of Regina, head of the Saskatchewan Cancer Clinic, lead a discussion on the work of the Clinic after showing an instructive film on cancer.

A dinner at the Chalet at 7.30 brought the enjoyable meeting to a close.

H. D. Hart

Medical Societies

District No. 4 British Columbia Medical Association

The annual meeting of No. 4 District Medical Association was held in Vernon on September ... A large attendance rewarded the Executive Committee for their ... in providing a very full programme, commencing at 2.00 o'clock and finishing at 10.30 p.m. This included an afternoon clinical ... and hour followed by dinner, ... on ... Health Insurance and other ... problems ... members. Dr. P. A. C. Cousland, President of the British Columbia Medical Association, ... and ... followed by Dr. M. W. Thomas, Executive Secretary of the ... and other ... also contributed to ... Dr. W. J. Knox, Kelowna; Dr. R. W. Irving and C. J. M. Willoughby of Kamloops; H. E. ... of Vernon.

Dr. ... Harris ... presided over all ... sessions and ... to the Honorary Secretary-Treasurer Dr. H. J. Alexander. Dr. H. A. D. ... and Lt.-Col. ... H. ... lecture at the afternoon session. Dr. W. P. McKechnie, of Armstrong ... and ... a vote of thanks to these gentlemen who had come to Vernon as ... speakers under the ... of the Committee on ... of the British Columbia Medical Association.

The election of officers resulted as follows: *President*—Dr. L. A. C. Panton, Kelowna; *Vice-president*—Dr. C. J. M. Willoughby, Kamloops; *Honorary Secretary-treasurer*—Dr. W. F. Anderson, Kelowna; *Representative to the Board of Directors of the British Columbia Medical Association*—Dr. L. A. C. Panton.

The members decided that the next annual meeting would be held in Kelowna and this was agreeable to the members from that place.

West Kootenay Medical Association

The West Kootenay Medical Association held its annual meeting at Nelson on September 25. Dr. N. E. Morrison, of Nelson, President and Dr. W. ... Laishley, Secretary, had made provision for the comfort of those who attended and excellent appointments for the various sessions of the meeting.

Dr. P. A. C. Cousland, of Victoria, President of the British Columbia Medical Association was in attendance and contributed a paper to the afternoon program which was devoted to

clinical features Dr W K Massey dealt with the newer surgery of the chest, and Drs Daly, Krause, and Hoare, of Trail, rounded out a very full program, which was followed by motion pictures shown by Dr Laishley

A social hour preceded the dinner, following which the annual business session was held The elections resulted in placing the following in office *Honorary President*—Dr C M Kingston, Grand Forks, *President*—Dr E E Topliff, Rossland, *Vice-president*—Dr J Vernon Murray, Creston, *Honorary Secretary-treasurer*—Dr Wilfrid Laishley, Nelson Dr Topliff, the new President, will be the representative from the West Kootenay on the Board of Directors of the British Columbia Medical Association It was reported that Dr Kingston, Honorary President, was ill and the secretary was asked to send him flowers with the good wishes of the Society

Drs Cousland, F M Auld J S Daly, Arnold Francis and others discussed the present status of Health Insurance legislation at Ottawa Dr M W Thomas, Executive Secretary of the College, was also present and discussed several items of interest to the profession at this time A Committee was appointed to study Health Insurance and be prepared to report to the Association on those features upon which the profession in general will be asked to voice an opinion, with particular reference to such questions as administration, standards, methods of remuneration and income limits

Dr W O Green, of Cranbrook, President of the East Kootenay Medical Association and Dr D W Davis, of Kimberley, travelled to Nelson and participated in the annual meeting of the West Kootenay Medical Association

J H MACDERMOT

Ontario Medical Association

District No 1 of the Ontario Medical Association comprising the counties of Essex, Kent, Elgin, Lambeth and Middlesex met in St Thomas on October 5 and 6 Dr C C White, of Chatham, presided The sessions on October 6 were scientific in nature In the morning Dr E L Brown, of St Thomas, read a paper on the "Treatment of burns", Dr G I Sawyer, of St Thomas, spoke on "Carotid sinus syndrome" and Dr D S Currie, of St Thomas, discussed "Low back pain" In the afternoon Dr D L Ewin, of St Thomas, considered medico legal problems and Dr L N Silverthorne, of Toronto, presented a paper on "Infections in childhood" This was discussed by Dr H S Little, of London Dr A H Gordon, of Montreal, contributed one of the studies that have made him so welcome in medical Societies in Ontario He spoke on "Bone changes in certain medical diseases"

A banquet in the evening brought a very profitable and enjoyable meeting to a close The guest speaker was Dr S F Marshall from the Lahey Clinic in Boston He delivered an address on "Surgical conditions of the stomach" Dr L G McCabe, of Windsor, and Mr Louis Blake Duff, of Welland, discussed the address

District No 10 held a business session in Fort William

Dr S F Marshall, of the Lahey Clinic was with the members of District No 2 in Brantford before going to St Thomas In the afternoon he spoke on "Acute abdominal emergencies" Dr Frank N Allen, also of the Lahey Clinic, gave an address on "Why do people feel tired and weak? — differential diagnosis and treatment" A business session of the District Council had been held in the forenoon In the evening at dinner the guest speaker was Dr W J Deadman, of Hamilton He spoke on "Canada's renaissance"

Counsellor District No 6 met in Cobourg On September 28 the District Council discussed the problems confronting the profession On September 29 a clinical session was held in the morning contributed to by Dr F N Blackwell, Cobourg, Dr G W Peacock, Grafton, Dr A R Richards Cobourg, Dr W H Birks, Bowmanville, and Dr George H Stobie, Belleville At luncheon addresses were given by Dr Torrington, President-Elect of the O M A and by the Hon R P Vivian, Minister of Public Health and Welfare, Province of Ontario In the afternoon session Dr F I Lewis, of Toronto, gave a lecture on the "Management of fresh fractures of the femur" and Dr W C McGuire, of Hamilton, spoke on the "Kenny method of treating infantile paralysis"

Counsellor District No 7 O M A held their annual meeting in Brockville General Hospital on September 23 A business agenda occupied the forenoon The afternoon session was addressed by Dr Douglas Ackman of Montreal, on the subject of the "Treatment of thermal burns" Dr Harris McPhedran, of Toronto, presented "Hyperthyroidism and heart disease" and Dr G W Mylks Sr, of Kingston, spoke on "Some common obstetrical problems" A dinner meeting was held in the evening The guest speakers were Dr J J Heagerty of Ottawa, Chairman of the Advisory Committee on Health Insurance and Dr H M Torrington President-Elect of the Ontario Medical Association

In Smith's Falls on September 22 Counsellor District No 8 had an interesting and profitable day The district council had an open meeting in the forenoon In the scientific session in the afternoon Dr Harris McPhedran, of Toronto, gave his paper on "Hyperthyroidism and heart disease" and Dr Douglas Ackman, of Montreal, discussed "Collapse therapy in pulmonary tuberculosis" In the evening the after dinner addresses were delivered by Dr H M Torrington, Mr Norman Dowd, Ottawa, Secretary-Treasurer Canadian Congress of Labour, and Dr J J Heagerty, of Ottawa M H V CAMERON

Correspondence

Medicine and the "Irregulars"

To the Editor:

Re the letter to you from Hilda R. Worden, St. Catharines, Ontario, headed "Medicine and the Irregulars" in the October issue. I am rather surprised you published such a thing, to the great mental [illegible] of the reader. It may be a good thing but I doubt it very much. You no doubt will get letters of protest. You surely will not [illegible] in [illegible] and [illegible].

[illegible] knowledge on [illegible] to [illegible] these people [illegible] So [illegible] on that?

[illegible]

Hamilton, Ontario,
October 2, 1943.

To the Editor:

[illegible]

I [illegible] taken from the Hamilton Telephone Directory, Classified Directory:

[illegible]	[illegible]
Sciatica	Goitre
Asthma	[illegible]
Weak [illegible]	Adenoid
[illegible]	Tonsils (sic)
Headache	[illegible]
[illegible]	[illegible]
Constipation	Female trouble
Heart trouble	Bowel trouble
Liver trouble	Stomach trouble
Kidney trouble	Eye trouble
Sleeplessness	Hay fever
Sour Stomach (sic)	Shoulders
[illegible]	Hips
[illegible]	Prostate trouble
Weakness	Foot trouble
[illegible]	

Of course the gentleman in question does not openly claim that he can cure these conditions, but by cleverly publishing this list he most [illegible] create the impression. And this one [illegible] is not an exception but reflects the [illegible] of the whole "profession", if one [illegible] to call them that.

I [illegible] each and every one of us has cases in [illegible] who have received manipulative treatment [illegible] until it was too late to [illegible] orthodox treatment. The whole [illegible] been taken up again *in extenso* on [illegible] the hearings re Health Insurance [illegible] would really be [illegible] strong enough stomach to [illegible] feeling first.

[illegible] pressure groups and [illegible] and unexpected [illegible] the Irregulars are permitted to [illegible] point on the matter [illegible] would and will be detrimental to [illegible] and chiropractic [illegible] of the National Health [illegible] Act. Moreover taking the interest of [illegible] it would be very desirable [illegible] the recognition from those [illegible] where they [illegible] have been recognized.

A. I. Pitt

P[illegible], Alta.
[illegible] 1943.

Special Correspondence

The London Letter

[illegible]

DOCTORS IN COUNCIL

The Government White Paper on the comprehensive Medical Service has not yet appeared but in any case the Annual Representative Meeting of the British Medical Association has just been concluded and naturally there has been much discussion on the future. Detailed reports are not yet available and some of the newspaper accounts have been unfortunately sensational.

The new president, Lord Dawson, who has taken this office for a second time, made it clear in his address that the profession had long wanted a health service; the acceptance of this fundamental fact is unquestioned. But the detailed working out of the form of this service is still a long way from completion. The B.M.A. representatives voted against a whole-time salaried State Medical Service, but it was made

clear that this was *not* a vote "against Beveridge" and indeed there is no mention in the famous report of a state service Certain foundation administrative reforms were urged as essential preliminaries These mostly centre round the enlargement of local authority areas

For the transition period the meeting favoured an extension of the National Health Insurance Service to provide for dependents of insured persons and to give specialist and other improved services But this is probably administratively very difficult to provide and it has been described as an elaborate method of excluding 10% of the population By next month there will be more details available for comment

FOOD IN HOSPITAL

A recent memorandum from the King's Fund makes searching criticisms of the diet of hospital patients and staff Samples were taken in three general hospitals in the greater London area and on the accepted calorie requirements for patients in bed two hospitals failed to provide sufficient, also at two hospitals the supply of protein was not up to standard and at one the calcium and iron intake was deficient None of the diets reached the accepted levels for vitamins A and C The nursing staff were also not receiving enough to eat in one hospital and in none was there enough vitamin A and C in the normal diet provided

In fact, in all respects—quantity, quality, nutritional standards, methods of preparation and service—it is concluded that hospital diet is not all that it should be To deal with this disquieting situation the King's Fund suggests that each hospital should have a permanent committee for diet and catering, with a catering officer and a dietitian, with the grouping of smaller hospitals and the services of a dietetic adviser by the Fund to raise the general standards

THE FUTURE OF PSYCHIATRY

Despite a great rise in public interest in the working of the mind it is fair to say that the medical profession in this country is ill equipped to deal with the obvious increase in the demand for mental hygiene The training in the medical schools is in general "scandalous", as the *British Medical Journal* has maintained, and the postgraduate facilities are not nearly good enough to warrant a sound training The Royal College of Physicians has an important committee dealing with this subject and its report, promised for the end of October, will be read with interest

Meanwhile another committee has been dealing with the postgraduate part of psychiatric training and this "Langdon Brown Committee" makes sweeping recommendations Four years' postgraduate training is essential, with experience of general medicine first in hospital or domiciliary work Some criticism is likely of the proposed detailed specialization within a specialty, for the committee suggest an honours diploma in one of six possible branches and there are great dangers in this But the general improvement in psychological training recommended is welcome

EYESIGHT AND NATIONAL HEALTH

Oxford is doing it again Yet another drive for some aspect of the nation's health is seen in the appeal recently issued for £250,000 to found a University department for research in ophthalmic problems Already, through Lord Nuffield's persistent generosity, there is a University Readership in ophthalmology, and the new plan, based on this beginning, includes laboratories, lecture rooms, a library and a museum in connection with the Oxford Eye Hospital Industry especially will benefit from better knowledge of problems of vision and for this and other reasons the new venture demands national support

ALAN MONCRIEFF

London, October, 1943

Canadian Medical War Services

MEDICAL OFFICERS APPOINTED TO THE ROYAL CANADIAN NAVAL SERVICE JUNE, JULY, AUGUST AND SEPTEMBER, 1943

(Previous lists appeared in February, May and September, 1943, issues)

SECTION IV

Name	*Address*	*Date of Entry*
Alexander, M	Saskatoon, Sask	1 6 43
Andruakitis, E	Montreal	1 7 43
Bremner, W E	Beachville, Ont	15 7 43
Coates, W O	Amherst, N S	9 8 43
Crum, R W	Toronto	27 9 43
Gauld, W H	Whitby, Ont	1 6 43
Gourley, R H	Montreal	1 7 43
Harlow, C M	Truro, N S	1 7 43
Holden, H	Toronto	1 6 43
Leslie, W L	Sault Ste Marie, Ont	18 8 43
McClure, W G	Vancouver	1 6 43
Morse, L R	Montreal	20 7 43
Mowry, A E	London, Ont	21 9 43
Robertson, J	Toronto	19 6 43
Steeves, L C	Montreal	26 7 43
Stewart, C G	Chatham, Ont	8 9 43
Struthers, R G	Toronto	1 9 43
Templin, M	Hamilton	27 5 43
Wilkey, J R	London, Ont	19 8 43
Wilkins, W W J	Kingston, Ont	1 9 43

MEDICAL OFFICERS APPOINTED TO THE R C A M.C — ACTIVE FORCE AUGUST, 1943

(Previous sections appeared in the February, March, May, July and September, 1943 issues)

SECTION XVII

Name Address	Date of Appointment
[illegible]	[illegible]
Hall [illegible] G O Vancouver	27 9 43
[illegible]	[illegible]
Ramsay D W, New Glasgow, N S	2 8 43
Reid, W R, Agincourt, Ont	22 10 43
Robinson, C E G, Pembroke, Ont	15 9 43
[illegible], A I, Saint John, N B	20 7 43
Schultman M Toronto	28 7 43
Scott J P Belleville, Ont	16 7 43
[illegible] C H Sault Ste Marie, Ont	6 7 43
[illegible] S Sydney N S	
Snell, A E Ottawa	31 7 43
Steen, O T Toronto	9 8 43
[illegible] I Quebec	21 7 43
[illegible] I W K Toronto	21 7 43
[illegible] T I, London Ont	21 7 43
Wall H B Toronto	17 7 43
White, T A, Vancouver	15 9-43
Wilson C H, Orillia, Ont	16 8 43

SEPTEMBER, 1943

SECTION XVIII

Name Address	Date of Appointment
[illegible]	[illegible]
[illegible]	[illegible]
[illegible] I D A Toronto	1 9 43
[illegible] S [illegible] Ont	1 9 43
[illegible], A D Toronto	1 9-43
[illegible] I J M Ottawa Ont	16 8 43
[illegible] I A Calgary	1 9 43
[illegible] I A I Canadian Army Overseas	15 7 43
[illegible] C W Brantford, Ont	1 10 43
[illegible] A G London Ont	1 9 43
[illegible]berg L Toronto	1 9 43
[illegible] O R Sparton, Ont	1 9 43
Grundy I C Windsor, Ont	1 9 43
H[illegible] I H Newcastle Ont	16 8 43
Harnel I R Toronto	1 9 43
Harper I S H Toronto	1 9 43
Harris G I, Amherstburg Ont	1 9 43
Harshman I P, Toronto	1 9 43
Hawes I G Toronto	1 9 43
Hawl G H, Toronto	1 9 43
Hemps F C Brantford, Ont	1 9 43
Henderson M H, Toronto	1 9 43
Hewson, R W Brantford, Ont	1 9 43
Hodgkiss W R, Toronto	1 9 43
Holley, W I London, Ont	23 8 43
Holmes R B London Ont	1 9 43
Hood A M Toronto	1 9 43
Howson F P Wingham Ont	1 9-43
Hubbell D I Thamesville, Ont	1 9 43
Hudson P W, Trail B C	1 9 43
Ingham G K Stratford Ont	16 8 43
Johnston I I Mimosa Ont	1 9 43
Johnston I L, Campbellford Ont	1 9 43
Kaplan S Toronto	1 9 43
Kline S Swift Current Sask	1 9 43
Lavers G D Nanton Alta	1 9 43
Laxtner R D Toronto	1 9 43
Leadman F P Ottawa Ont	16 8 43
Lewis, J A K Toronto	1 9 43
Lewis J S, Medicine Hat, Alta	1 9 43
Lindsay I H Toronto	1 9-43
Lloyd H H Chesterville Ont	16 8 43
Logan I Frontier Sask	1 9-43
Maddison G I Halifax	1 9 43
Maroosis I P G Paris Ont	1 9-43
Miller W R A Toronto	1 9 43
Milner M Vegreville, Alta	16 8 43
Milrod, S Toronto	1 9 43
Montemuro, T, Sudbury Ont	1 9 43
Mottram L F Toronto	1 9 43
McFadden I A Dauphin, Man	15 9 43
McGoey, C I Woodmere, N Y	1 9 43
McKelvey A D, Toronto	1 9 43
McKendry I B R, Winchester Ont	16 8 43
McLean D F B, Toronto	1 10 43
McNichol I W, Hamilton Ont	23 8 43
MacDonald, G R Edmonton	1 9 43
MacDonald S A Canadian Army Overseas	9 11 42

Name	Address	Date of Appointment
MacFarlane, N W	Hamilton, Ont	1 9 43
MacKay, I M	Toronto	1 9 43
MacNeill, D C	Toronto	1 9 43
Nancekivell, E W	Hamilton, Ont	1 9 43
Nicholson, G A	Revelstoke, B C	1 9 43
Nicholson, G M	Hamilton, Ont	30 8 43
Orton, T H.	Toronto	1 9 43
Palanek, F G	London, Ont	1 9 43
Parker, C W	Guelph, Ont	1 9 43
Pascal, O	Toronto	16 8 43
Patterson, L A	Queen Charlotte Islands, B C	27 9 43
Percheson, P B	Ft William, Ont	16 8 43
Pow, R E	Pincher Creek, Alta	1 9 43
Pratten, J S	Peterborough, Ont	1 9 43
Purkis, R S A	Calgary	1 9 43
Quigley, G J J	Toronto	1 9 43
Quinlan J J	Stratford, Ont	1 9 43
Rae, J M	North Battleford, Sask	1 9 43
Ramgosky, T M	Edmonton	1 9 43
Ratz, R G	Kitchener, Ont	21 9 43
Rigg, F D	Dunnville, Ont	3 9 43
Richardson, C A	Ottawa, Ont	16 8 43
Robb, W A	Qu'Appelle, Sask	1 9 43
Ross, M	Canadian Army Overseas	12 11 42
Rother, I	Toronto	1 9 43
Russell, W F	Coombs, B C	1 9 43
Sands, C A	Toronto	1 9 43
Scratch, N W	Maymont, Sask	1 9 43
Sears, S F	St Stephen, N B	1 9 43
Sedwick, W S	Toronto	1 9 43
Serada, M M	Edmonton	20 9 43
Seymour, B A	Haileybury, Ont	1 9 43
Shapiro, S K	London, Ont	1 9 43
Shragge, P	Edmonton	1 9 43
Slater, H M	Toronto	1 9 43
Solmes, J G R	Oshawa, Ont	1 9 43
Spohn, P H	Vancouver	15 9 43
Stephenson, G H	Vancouver	15 9 43
Stewart, J M	London, Ont	1 9 43
Stewart, L N	Radville, Sask	1 9 43
Tidey, V L	Hamilton, Ont	1 9 43
Tillman, W A	London, Ont	1 9 43
Tompkins, A D	Saskatoon, Sask	15 9 43
Tredger, C N	Edmonton	1 9 43
Tufford, W H	Beamsville, Ont	1 9 43
Upton, M D	London, Ont	1 9 43
Wagner, G H	Toronto	6 9 43
Walker, J H	London, Ont	1 9 43
Walsh, A C	Vancouver	1 9 43
Warshawski, S J	Edmonton	1 9 43
Weder, C H.	Prince Rupert, B C	1 9 43
White, W T	Sudbury, Ont	1 9 43
Willcox, G L	Calgary	1 9 43
Williscroft, B A	Owen Sound, Ont	24 8 43
Wong, W A	London, Ont	1 9 43
Wood R G A	Lunenburg, N S	7 9 43
Woodman, F L	Edmonton	1 9 43
Young, W A	Kingston, Ont	16 8-43

University Notes

Université de Montréal

Le Dr Hector Sanche a été nommé professeur titulaire de la chaire d'obstétrique tandis que le Dr Rosario Fontaine accède à celle de Médecine légale et Toxicologie JEAN SAUCIER

Miscellany

MEDICAL ART IN CANADA

By Eleanor A Sweezey, B A

Montreal

Every day our medical students are taught inaccuracies The student studies his textbooks, the text is amplified by illustrations, and a shocking number of the illustrations are inaccurate A picture is easier to understand and remember than several pages of text, but our doctors, trained themselves by similar textbooks, fail in their responsibility toward the students by tolerating poor illustrations Why are these inaccurate drawings permitted to appear in the best known anatomical and other texts side by side with pictures of the highest calibre? Many members of the medical profession have only the vaguest idea of the function of the medical artist and fail to realize that illustrations, to have any value, must be made by artists with sound training in the field of art as applied to medicine It is a strange phenomenon that the medical profession, which insists on scientific accuracy on the part of doctors, nurses, technicians, should tolerate such gross inaccuracies in the field of illustration It cannot be coincidence that the doctors who show a constructive interest in medical art are usually those ranking highest in their profession

Many doctors are convinced that photography is a better medium for illustration than the plastic arts The two media however, are mutually exclusive Every trained medical artist will agree that whenever photography is adequate it should be used Nothing is more irritating to an artist than to be asked to draw a specimen which could more easily be photographed It is a waste of time and lacks interest The artist's function is to select and interpret In the illustration of operations for example, the camera cannot reveal landmarks by showing the patient undraped, it cannot omit swabs and blood stains which may be mistaken for the tissues, it cannot show a typical, rather than a particular, operation The surgeon is usually interested in illustrating the technique of an operation so that others may perform it He does not want to show accidental details and artefacts which detract from the essential incisions, dissections, sutures, etc Or, when sagittal sections of living patients are required the camera is useless, but the artist may build up an instructive and valuable picture with the aid of x-rays and direct examination of the patient Similarly, there are other occasions when the camera is inadequate but the above will serve as illustrations

The same objections which apply to the camera as the sole medium of medical illustration—and many more—apply to the artist with only art school training The camera may reproduce artefacts, include unessential detail which obscures the point in question, and pre-

sent an unpleasing and vague illustration but what little it does show is at least accurate, and we can forgive a camera for being inartistic But the artist who is untrained in the medical sciences is likely to use an unnecessarily complicated medium and to include actual inaccuracies, for he will not have the necessary sense of responsibility toward the medical profession The average art school student is concerned with making pictures which are attractive to the eye rather than to the mind Two questions must be uppermost in the mind of the medical artist Does the picture tell the story? Will it reproduce? If it will not reproduce clearly and inexpensively the most exquisite work is wasted The drawing must be reduced to its simplest form Anything which does not contribute to the understanding of the story must be considered wrong This does not mean that the drawing can have no artistic value Simplicity is the keynote of beauty in all forms of art

Apart from ordinary art school training and training in the special techniques required for medical illustration the following requirements are necessary for the medical artist (1) A knowledge of anatomy (gross, microscopic and surgical) at least as thorough as that required by medical students (2) A working knowledge of pathology—gross and microscopic (3) A working knowledge of embryology and comparative anatomy (4) The ability to interpret x-ray pictures (5) Familiarity with the various ophthalmoscope, ophthalmoscope, otoscope, etc (6) A knowledge of Greek and Latin although not essential is useful in acquiring familiarity with medical terms Similarly a knowledge of German makes it easier to read some of the current literature simpler One does not expect to draw but one requires the use of photographs, text books and periodical literature at operations and autopsies personal direction by the artist, studies of fresh specimens post mortem, etc The artist must not depend upon the doctor to produce the same material The doctor is busy, as he should be, and in any case the artist must have a thorough understanding of the subject in order to produce a convincing picture It is not enough to add a few artistic flourishes to an outline hastily laid down by the doctor

In addition the danger of producing poor illustrations particularly arises because the medical profession does not recognize the necessity for trained artists and is not willing to pay them a reasonable salary There are nine medical schools in this country,* and only one supports a permanent medical art service department The University of Toronto is doing more to establish and sustain a high grade of medical illustration than the other eight medical schools combined It is to be hoped that they will soon follow her lead but they all tell the same story the medical school is financially poor It cannot even afford to buy all the equipment which it requires, so, obviously, it cannot afford the luxury of an artist But are textbooks luxuries? Textbooks require illustrations, or at least their authors and editors believe that they do So much do they believe it, in fact, that they will use illustrations which obscure rather than supplement the text

It has not infrequently been said in the department of art as applied to medicine at the John Hopkins Medical School that the Canadian students have been of consistently high calibre But what has happened to this group so carefully trained by the famous Max Brodel and whom he expected to be such a credit to his teaching? Some have found jobs in hospitals, some have been reasonably successful, free lancing but until the medical schools give them a recognized place it will be difficult to establish the necessary standards and to educate the whole profession to the appreciation of the difference between trained and untrained artists Many of Mr Brodel's students are women who have married and are now doing a small amount of free lancing Some have taken jobs in the United States Must Canada continue to lose her best professional men and women to the States? Some others have found it necessary to give up their profession and seek employment in other fields It is unlikely that they have given it up from choice Medical art requires at times hours of painstaking and tedious work but it is never dull It is a field of infinite variety and interest in which each artist can and must build so young must make original contribution Must Canadian artists with years of training be forced to give up either their profession or their country while the medical profession is cramped and degraded by inferior illustrations in textbooks journals and classroom charts? It is time to help Canada to lead in a field for which Canadians have shown a particular aptitude

* (1) University of Alberta (2) University of Manitoba (3) Dalhousie University, (4) Queen's University, (5) University of Western Ontario, (6) University of Toronto, (7) McGill University, (8) University of Montreal, (9) Laval University

Abstracts from Current Literature

Medicine

Comparative Value of Digitalis and of Ouabain in the Treatment of Heart Failure Chavez, I *Arch Int Med*, 1943, 72 105

The author expresses surprise that ouabain is almost completely disregarded in the treatment of heart failure throughout the United States In Europe it is treated with more respect in fact it is even described as "The heroic remedy for acute or irreducible heart failure" He compares the physiological action of it and digitalis While they both act rather on the heart than on the blood vessels and both act partially through the vagus nerve there are great differences in the mechanism of their effect

Digitalis depresses the activity of the auricular sinus and blocks the auriculoventricular conduction and so the impulses from the auricle It increases the

irritability of the muscle fibre, also its contractility The increase in tone of the muscle is shown by a decrease in the size of the heart This means a greater efficiency and a better coronary blood supply Ouabain has less effect on auriculoventricular conduction so has less effect on tachycardia and in controlling auricular fibrillation

Ouabain produces its effect by stimulating function, not by depressing The contractility and tone of the striated muscle are reinforced, increasing the energy of systolic contraction and so decreasing the size of the heart In this respect it is greatly superior to digitalis Obviously, it would restore collapsed blood pressure in an acute heart failure

Digitalis is usually given by mouth and is slowly absorbed through the intestine Ouabain is best given intravenously and produces response very quickly Also digitalis has to be given in larger amounts than can be eliminated so is accumulative Ouabain dosage is about equal to the amount the body can destroy, so is not accumulative The two drugs resemble each other in their effect on the electrocardiogram, and in their toxic effects

Coming to the clinical application, ouabain with its rapid effect is specially useful in acute heart failure, nocturnal dyspnœa and pulmonary œdema Its rapidity of absorption is useful in emergencies Digitalis is at its best in congestive heart failure, tachycardia including auricular fibrillation and, most important perhaps, rheumatic fever Ouabain is more useful in chronic failure of the left ventricle from coronary disease, long standing hypertension and complicated syphilitic aortitis Here the improvement in systolic energy with reduction in the size of the heart is very important

Digitalis, then will be used with children, adults and all the rheumatic fever group, ouabain more for those cases in the second half of life, aged persons particularly and those with vascular disease including coronary sclerosis, syphilis and cardiorenal breakdown

The two drugs, then, can be used to supplement each other, digitalis taking over when ouabain has helped in an emergency As regards the technique of administration the author suggests 0 25 mgm daily for six days intravenously Rarely is a second dose needed in one day The drug can be given over as long a period as necessary—months—even years

P M MACDONNELL

Recent Work on Blood Transfusion in Britain Mollison, P L. *Brit Med Bull*, 1943, 1 83

In the war of 1914 18 the conclusion had already been reached that the most effective single step in the treatment of severe wound shock was the restoration of blood volume by blood transfusion Inevitably, therefore, great attention has been given to all aspects of this subject in the present war and knowledge has advanced very considerably

Apparatus—One of the most important if undramatic advances has been the introduction of a simple standardized apparatus for taking and giving blood by a closed method, that is to say, one in which the blood does not come into direct contact with the open air Because of the standardization there is complete interchangeability of apparatus from all parts of the country, whether produced by the civilian or military services

Stored Blood—Storage of blood was practised in only a few hospitals in Britain before the present war In anticipation of the demands which very heavy air raids might create, blood banks were established in London at the beginning of the war and in other parts of the country soon afterwards At first, blood was stored in a simple citrate saline solution, but soon the observation by Rous and Turner of the beneficial effect of the addition of glucose was confirmed (Harington and Miles, 1939, Maizels and Whittaker, 1940a, Dubash, Clegg and Vaughan, 1940) and a citrate glucose mixture came into general use At first, there was naturally much discussion as to the relative merits of stored and fresh blood Early reports showed, however, that transfusions of stored blood did not give rise to more reactions than those of fresh blood (Stewart, 1940), and that the former were equally efficacious, at least in the treatment of acute hæmorrhage (Brewer, Maizels, Oliver and Vaughan, 1940)

It was realized that the exact value of stored blood could be most satisfactorily measured by estimating the survival rate of the erythrocytes after transfusion, and many workers reported that erythrocytes stored in citrate glucose mixtures survive well in the recipient's circulation (Bushby, Kekwick, Marriott and Whitby, 1940, Maizels and Paterson, 1940 Mollison and Young, 1940) Many interesting observations were published upon the physical and chemical changes occurring during storage (Maizels and Whittaker, 1939, 1940a, 1940b, Crosbie and Scarborough, 1940, 1941, 1942, Scarborough and Thompson, 1940) Earlier work was confirmed when it was shown that the erythrocytes lose potassium during storage (Downman, Oliver and Young 1940, Aylward, Mainwaring and Wilkinson, 1940) Maizels and Paterson showed, however, that some at least of these changes were reversible and that stored erythrocytes lost sodium again in the recipient's circulation after transfusion Some confusion continued to exist as to the best preservative solution and Maizels (1941b) suggested that the laboratory test of measuring the osmotic fragility of stored erythrocytes might give a false indication of the way in which they would survive after transfusion This point of view was supported by Mollison and Young (1941) who found that, although red cells stored in the Rous Turner solution became very fragile, they survived very well in the recipient's circulation Conversely, red cells stored in sucrose became very resistant to hæmolysis by hypotonic saline but survived poorly in the recipient's circulation These workers found that other *in vitro* tests were also misleading, and they therefore undertook a trial of several preservative solutions, using both *in vivo* and *in vitro* tests (Mollison and Young, 1942) They found that the Rous Turner solution was the best, but considered that its large bulk was too great a disadvantage to warrant its use in preference to the ordinary small volume citrate glucose solution

All citrate glucose solutions have one disadvantage, namely that the citrate and glucose solutions have to be autoclaved separately to prevent the occurrence of caramelization Evans, Thorley and McLeod (1942) showed, however, that if the mixture were acidified with carbon dioxide before autoclaving caramelization was prevented Later, Loutit, Mollison and Young (1943) found that this method was ineffective in their autoclaves, but observed that the addition of citric acid in suitable proportions not only diminished caramel formation but greatly improved the preservative properties of the solution as judged by the survival *in vivo* of the erythrocytes after transfusion There seems to be little doubt that acidified citrate glucose mixtures are the most satisfactory blood preservatives yet discovered

Plasma and serum—The only blood substitute available in the last war with an osmotic pressure of the order of human plasma was gum saline, which was eventually shown to have serious disadvantages despite the good immediate results attending its use Great attention has been given in the present war to the problems involved in using stored human plasma and serum as blood substitutes In the beginning, the advantage of preparing plasma seemed obvious, since plasma could be obtained as a by product from stored blood After MacKay (1941) had shown that none of the available antiseptics could be relied upon to inhibit bacterial growth in liquid plasma in a concentration which would not be toxic if a large transfusion had to be given, it was recognized that plasma stored in the liquid state would have to be Seitz filtered before storage It was found, however, that

sitized to the Rh agglutinogen had suffered severe hæmolytic reactions due to the transfusion of Rh positive blood Taylor, Race, Prior and Ikin (1942) have described some of the difficulties which may be encountered in making tests for Rh agglutinogens and agglutinins and in particular have drawn attention to the occurrence of zoning in certain anti Rh sera

Destruction of erythrocytes in vivo—Application of the technique of differential agglutination, whereby the survival rate of transfused erythrocytes in the recipient's circulation can be estimated quantitatively, is likely to prove increasingly important in the solution of blood transfusion problems As mentioned above, this method has already been used to decide the question of the value of various solutions for the storage of blood, and the same method is proving invaluable in investigating the new problem of intra group incompatibility (Mollison, 1943) Transfused erythrocytes should not be eliminated from the recipient's circulation at a rate greater than approximately 1% per day A study of the causes which lead to an increase in this rate should add much to knowledge of hematology in general

The damage to the recipient's erythrocytes that can be caused by the transfusion of blood, the plasma of which contains high titre incompatible agglutinins, was studied by Aubert, Boorman, Dodd and Loutit (1942) To simplify the problem, they used plasma of group O rather than blood of group O, and administered it intravenously to subjects of group A They found that when the plasma contained very potent anti A agglutinins, samples taken from the recipient immediately after transfusion might show hæmoglobinæmia or intravascular agglutination Nevertheless, in no case did they produce a really serious reaction

Summary of progress—Investigators in the field of blood transfusion may be said to have achieved important objectives during the present war The apparatus has been so simplified that transfusions can be given under almost any circumstances Stored blood can now be kept for periods of 3 weeks or more and still be virtually as efficacious as fresh blood from the point of view of restoring blood volume and of supplying functioning erythrocytes Stable and satisfactory blood substitutes which can be stored for months or years have been provided Finally, understanding of transfusion accidents and, therefore, of the means of preventing them has advanced very considerably

[*The very extensive list of references may be had on application to the Editor*]

Surgery

Planning for the Treatment of Head Injuries Cairns, H *Brit M J*, 1943, 1 313

The treatment and prognosis of head injuries is still governed in many instances by outdated pathological doctrines that imply that bruising of the brain is an almost invariable accompaniment of even minor concussion, and that the bruising takes a long time to resolve and might continue to produce symptoms for a number of years Patients are still encountered who have been confined to bed for weeks or months after relatively trivial head injuries and have been warned not to resume full normal activity for periods of months or a year The late results of blunt head injury have been painted blacker than they really are The majority of civilian patients with head injury make a satisfactory return to work within six months Operation is often required for the repair of scalp wounds but for other purposes in not more than 5% of cases In the majority of head injuries in civilians the main factors in rehabilitation are the doctor's knowledge of the patient and of his social conditions, as well as of his injury, and a sustained interest in him until he is once more back at work There is no need for institutional rehabilitation in the majority of cases of civilian head injury There is nothing "new" about rehabilitation, unless it is a more general realization by the medical profession of its responsibilities for convalescence of all patients, and the formal recognition of the part which a patient's personality plays in his readjustment to injury or disease If the experiences with head injuries are any guide, it would seem that much of the after care of the nation's sick and injured should continue to be directed by the doctor who treats the patient in the acute stage of his illness If in his student days he can be taught the after care of patients in a practical way, and if he can be supplied with more adequate assistance from social services, and from employers, this task should not be beyond him FRANK TURNBULL

A Comparison of the Effects of Tanning Agents and of Vaseline Gauze on Fresh Wounds of Man Hirshfeld, J W, Pilling, M A and Maun, M E *Surg, Gyn & Obst*, 1943, 76 556

Modern methods of treating burns began in 1925 when Davidson incontrovertibly achieved a great reduction in mortality by introducing the tannic acid method Since then great efforts have been made to produce as good results by other means Controversy has arisen and the use of tannic acid has been attacked, not without some success A further investigation to show that tannic acid is an irritating and necrotizing agent to tissue is put forward by the authors By using a Padgett dermatome they produced a series of wounds, in twelve cases, similar in most respects to second degree burns—the only degree of burn for which tannic acid may properly be used Half the wounds were treated with tannic acid and half with vaseline gauze Biopsy specimens of the healing tissue were obtained from 1 to 150 hours

Excellent colour microphotographs at various stages of healing accompany the article They show that tanning agents destroy the remaining vital dermis to a great depth In addition a marked leucocytic exudate is seen beneath the eschar with further destruction of the collagenous bundles of the dermis The portions of the epithelial structures contained in these layers are destroyed, so that epithelialization finally takes place beneath the exudate Vaseline gauze caused none of these deleterious effects and with its use healing was more rapid J R LACROIX

Immediate Active Motion Treatment of Fractures of the Head and Neck of the Radius Mason, J A and Shutkin, N M *Surg, Gyn & Obst*, 1943, 76 731

At present there are two main ways of treating fractures of the radial head and neck One is conservative with immobilization, and the other is radical with removal of the head Both methods result in long periods of disability and frequently leave some degree of permanent immobility of the elbow joint Consequently a better method is sought by the author The elbow is a bicondylar joint but the two condyles do not have the same axis nor do they move through the same arc Perfect synchronization is necessary The reduction of fragments of a fractured elbow may eliminate any obvious deformity in the position in which they are immobilized but may still not restore the state of synchronization required for the joint to pass through its full range of movement X rays are not an accurate guide to an anatomically perfect reduction, and fixation until calcification has occurred insures only that any displacement is rendered permanent Function is what must be sought The fragments are small and uncontrollable by any method By beginning active motion of the elbow early these fragments will be moved across the fixed, uninjured articular surfaces of the humerus, and will thus attain the best functional position in relation to the various joint surfaces

The arm is supported in a sling and hot packs are used to treat the soft tissue injury and muscle spasm From the beginning the elbow is put through its full range of *active* movement twice a day—flexion, exten

ion supination and pronation A series of 25 cases is presented Seven had conventional treatment with poor results 18 had early active movement with a rapid return to full function These cases were all impacted linear fractures or comminuted fractures without marked displacement More complicated comminuted fractures or transverse fracture with gross rotation of the head have not been included in this method of treatment and it does not seem likely that such cases can be thus managed the radial head removed I P Fletcher

Obstetrics and Gynæcology

Rupture of Rectus Abdominis Muscle During Pregnancy Thomas R C *Brit M J*, 1943, 2 136

A case of rupture of the rectus abdominis muscle during pregnancy is reported The records of two previous instances of the same condition are referred to All had reported to their doctor before the rupture occurred all were multiparæ in which it is probable that the rectus sheath had been relaxed by previous pregnancies the rupture of the right rectus was in the weaker portion of the sheath which is more developed below and the complete rupture of the posterior sheath was also recorded In the case described the rupture of the posterior sheath was above the umbilical level The condition is stated to give rise to difficulties during labour Ed Minerva

Caudal Anæsthesia for Cæsarean Section Lee Chee Yin and Ho Ho Meng *Malaya M J*, 1943, 18 46 274

The use of the epidural space in the production of caudal block in cases of Cæsarean section is described The technique is not described in detail The procedure which is known as Lumbosacral Caudal Epidural Block is employed The anæsthesia is said to be of the type of saddle block Ed Minerva

Carcinoma of the Vulva and Vagina in Infancy Hope P H and Parr V *Amer J Obst & Gyn*, 1943, 46 286

Cases of the female external genital organs are most rare A case of carcinoma occurring in the vulva and the lower part of the vagina is reported Signs of the disease appeared when the child was 6 months old and after 4 months' treatment the primary growth was considered to be cured The child was readmitted when 2 years old This time the disease was inoperable the child was emaciated and died This is one of the youngest cases recorded all the previous case of carcinoma in this site to be found in the literature Ed Minerva

Effect of Pregnancy on the Mineral Content of Dentin of Human Teeth Bodian M and Lowin *Amer J Obst & Gyn*, 1941, 46 205

No significant difference could be found between the average specific gravity index of the degree of calcification of dentin from pregnant women and from other individuals The average specific gravity for dentin of the pregnant group was 2.12 while that of the non-pregnant control was 2.08

It was concluded that gestation did not cause a withdrawal of calcium salts from the dentin and therefore, the carious sclerods present in this group of pregnant women was not associated with a metabolic demineralization of that tissue Ed Minerva

Significance of the Degree of Calcification Hemmig A M *J Obst & Gyn Brit Emp* 1943, 50: 175

Approximately half of a small series of 200 placentæ examined by x-ray showed a moderate degree of calcification There was some evidence that the supplementing of the mother's diet with calcium and vitamins resulted in a decrease in the number of placentæ without any calcification and an increase in the number of those showing a moderate and marked degree of calcification Some relation was demonstrated between the degree of calcification of the placenta and (1) the absence of dental caries as noted at the first antenatal visit (2) the absence of a complaint of œdema (3) the duration of labour, (4) the birth weight of the infant (5) the absence of transient difficulty in the act of sucking (6) the absence of transient icterus neonatorum The amount of calcium seen in the placenta did not appear to vary with the age of the mother nor the sex of the infant The degree of calcification of the placenta was not related with the duration of gestation, the efficiency of the 3rd stage of labour the change in weight of the infant by the 8th day the sufficiency of the milk supply and the incidence of stillbirths and neonatal deaths In the patient grouped according to the degree of calcification of the placenta no significant difference in the presence of œdema of the feet and ankle the duration of gestation the duration of labour, the change in weight of the infant by the 8th day the occurrence of transient difficulties in [illegible] the occurrence of transient icterus neonatorum was found when the treated and control patients were compared P J Kerr

Pædiatrics

The Sanatorium Method for the Cure of Rheumatic Heart Disease in Children Taran, I M *J Ped*, 1943, 23 1

Sanatorium care as a form of therapy in the management of the rheumatic heart in children is receiving increased attention in medical circles The author's purpose in this paper is to show the results which have been in existence since 1936 Only children with active rheumatic infection are admitted The average stay is 10 weeks Patients are followed for 7 months while at home and are examined by several visits Years of experience have led to a subdivision of the disease and type of the heart into three groups Group I consists of pure rheumatic carditis Group II consists of rheumatic carditis with evidence of chronic impairment Group III consists of rheumatic carditis with chorea The author states that after seven years' experience that not all rheumatic children are to be admitted to sanatoria Only those in the active stage should be admitted Physicians should be careful in the selection of the children for sanatorium care and the results are gratifying S F Issaf

Radiology

Correlation of Disability with Roentgen and Clinical Findings in Silicosis Heron J W G *Lancet* 1943, 11 11

Pneumoconiosis presents a medicolegal problem of major importance Many studies have been made of the etiology pathogenesis and x-ray diagnosis but until recently very little has been done on the practical physiological aspect outside of a few of the more scientific laboratories Measurement of disability is becoming more important as there is a growing tendency for workmen's compensation boards to adjust awards to the degree of disability

The degree of dysfunction of the lungs in pulmonary fibrosis is not proportional to the amount of anatomic change revealed by the x-ray film Inhalation of toxic dusts, such as silicon dioxide, frequently decreases pulmonary function before the shadows of the silicotic nodule become visible on the roentgenogram Disability in silicotics varies greatly in degree although the x-ray films in two or more cases may indicate that the abnormal changes are apparently equal This is especially true in the moderate and far-advanced cases The disability in silicotics is due to inadequate oxygen supply the result of thickening and rigidity of the pulmonary alveolar walls and the associated emphysematous changes together with œdema of the air spaces and terminal bronchioles

and engorgement of the capillaries surrounding these structures This disability cannot be interpreted by the degree of nodular fibrosis shown on an x ray film

The author believes exercise tests are more practical and less complicated than measuring the components of the total respiratory capacity In giving an opinion of a man's disability they estimate, in percentage, his ability to work

For this purpose they use a bicycle ergometer as developed at the McIntyre Porcupine Clinic for Silicosis Research The working of this machine is explained R C BURR

Venography with Fluoroscopy in Venous Lesions of the Lower Limb Lesser, A and Raider, L *Radiology,* 1943, **41** 157

The authors use a combined fluoroscopic and radiographic technique which has many advantages over radiography alone The fluoroscope gives the dynamic picture of a functioning organ in addition to the static impression obtained during a momentary exposure The involved area, having been localized under the screen, is then radiographed

The interpretation of normal and pathological venograms is discussed and five cases of various types are presented, with illustrative venograms Deep thrombophlebitis does not always present the clear cut clinical picture so frequently described in the textbooks, but accurate information of the site of obstruction can be readily obtained by venography of the lower extremity In the presence of a clinical history suggesting deep vein thrombophlebitis, even though physical findings have completely subsided, venography should be undertaken The prophylactic value of ligation proximal to such a thrombophlebitic process is obvious

The problem of varicose veins lends itself readily to venographic investigation The clinical tests ordinarily employed to evaluate the status of the deep veins are often inconclusive Since it is upon this status that the indications for surgical ligation and sclerosing therapy are dependent, venography is of use in evaluating cases which have not responded to therapy In some instances an incompetent communicating vein is present which, through retrograde flow keeps the varicosities patent In others collateralization around the ligated and resected segment causes the failure to respond After these abnormal vessels are located by venography, their ligation may result in cure of the varicosities

In none of the 25 cases were there any severe effects No thrombi were dislodged, nor did phlebitis occur at the site of injection in any patient One man showed a sensitivity to diodrast manifested by a marked urticaria This was relieved by the administration of adrenalin These findings are consistent with those of other workers R C Burr

Hygiene and Public Health

The Preventive Medicine Program of the United States Army Simmons, J S *Am J Pub Health,* 1943, **33** 931

As in civil life so in the army the responsibility of medical men is two fold, (1) to care for the sick and injured, and (2) to prevent as far as possible sickness and injury To discharge this second responsibility the Preventive Medicine Division, Office of the Surgeon General, U S Army has been created, of which the author of this article is the Director The Preventive Medicine Division now includes the following branches Sanitation, Sanitary Engineering, Epidemiology, Laboratories, Military Occupational Hygiene, Venereal Disease Control and Medical Intelligence

The Sanitation Branch is traditionally the backbone of preventive medicine in the army It is concerned with the maintenance of safe water supplies and sewage disposal, food handling and with insect control The Sanitary Engineering Branch deals with the engineering aspects of sanitation, large water purification plants, sewage disposal systems, large scale control of rodents and insects It works closely with the Corps of Engineers

The Epidemiology Branch is concerned chiefly with the control of infectious diseases The immunization program of the army is supervised by this branch All troops are vaccinated and revaccinated against smallpox, typhoid fever and paratyphoid fevers A and B They are immunized against tetanus Troops going to infected areas are immunized against yellow fever, typhus fever, cholera and plague The exact degree of protection afforded against the last three diseases by immunization is still uncertain Malaria actually is the most important tropical disease No effective immunizing agent has been discovered for malaria The Laboratories Branch maintains laboratories The Military Occupational Hygiene Branch has been established to safeguard the health of civilian workers in industries operated by the army The medical services in the various plants are supervised and the working conditions and occupational hazards are investigated At Fort Knox a special laboratory has been set up to study the hazards of tanks and other mechanized vehicles The Venereal Disease Control Branch is responsible for the formulation of policies for the control of venereal disease

The Medical Intelligence Branch is a new development in military preventive medicine Its duty is to collect and disseminate specific information about health and disease conditions in foreign countries in order to provide a basis for planning measures and equipment necessary to protect troops in those countries

In addition to the above named branches a civilian board for the control of epidemics has been appointed Its primary function is to advise the Surgeon General regarding measures to be taken in the event of an epidemic and to undertake, if necessary, duties in the field should an epidemic occur It also undertakes investigations of various types and to that end has established 10 commissions to study specific problems FRANK G PEDLEY

The Toxicity of Lead Azide Fairhall, L T, Jenrette, W V, Jones, S W and Pritchard, E A *Pub Health Rpts,* 1943, **58** 607

The increased use of lead azide ($Pb(N_3)$ as a detonator in shells has led to this investigation into the possible toxic hazard of the substance Lead azide is prepared commercially by precipitation from a soluble lead salt by the addition of sodium azide Sodium azide is prepared by the action of nitrous oxide on sodamide ($NaNH$) In these reactions there is a possibility of the liberation of hydrazoic acid (HN_3) Actually in the handling of lead azide there is little danger of poisoning because extreme care must be used to prevent the liberation of dust on account of the explosion hazard The danger to be anticipated is from the soluble lead salt which might be handled carelessly, and from the hydrazoic acid

Experiments with rats indicate that lead azide has considerably more toxicity than would be expected on the basis of the amount of lead It is the azoimide molecular group that is probably the really toxic part of the substance Experiments with sodium azide show it to be much more toxic than lead azide The minimum lethal dose of sodium azide injected intraperitoneally lies between 35 and 38 mgm per kilo of body weight, while up to 150 mgm per kilo of lead azide can be tolerated Hydrazoic acid invariably kills at concentrations beyond 1,160 parts per million, breathed for one hour Rats exposed to such concentrations show first excitability followed by dyspnœa lachrymation, salivation, and loss of muscular co ordination of the extremities In man the fumes of hydrazoic acid cause headache and eye irritation FRANK G PEDLEY

Obituaries

Dr William Proudfoot Caven died at his home in Toronto on September 22 at the age of 82. Dr Caven retired only two years ago after forty years in practice as consulting physician. He was born in St Mary's Ont and came to Toronto as a boy when his distinguished father Rev. Dr William Caven was made Principal of Knox College. His mother was Margaret Goldie Caven. He was educated in Jarvis Street Collegiate and University of Toronto from which he graduated M.B. in 1886. After two years in the University of London he returned to Canada and began practice in Toronto. On the retirement of Professor J. L. Graham he acquired the property and practice of the latter and restricted his work to consultation in medicine. For half a century he was the kindly and helpful counsellor to the practitioners of Ontario and his fame spread far and wide. He also served for many years as Professor of Clinical Medicine in the University.

Dr Caven's older brother was Dr John Caven at present professor of Pathology in the University of Toronto. His younger brother Dr James G. Caven has recently retired from consulting practice and has replaced Dr W. Robertson Craven as specialist in internal medicine.

Dr Caven's defect controlled to the interest of medicine. He was too busy to write and he had no Boswell to do for him what his readers experience and the public that grew out of it. Few men have acquired fame by recording their own. Dr Caven considered this as part of his duty. Medicine is poorer in that respect but richer in material that never before was made available.

Dr Caven was a charter Fellow of the Toronto Academy of Medicine and was made Honorary Fellow in 1938. He is survived by his sister Mrs. Taylor and two sisters. The Academy respectfully offers condolence to the family circle and mourns with them a colleague who enjoyed the affection and esteem of every Fellow.

Dr Paul O'Sullivan died on October 1 in Christie Street Hospital. He had been in poor health for a year or more but entered hospital a week before his death at the age of 53.

Dr O'Sullivan was born in Toronto the son of the late D. A. O'Sullivan, Q.C., LL.D. and Mrs. Bigger O'Sullivan. He was educated at St. Michael's College and the University of Toronto. He graduated B.A. in 1910, M.A. in 1911, M.B. in 1914 and Ph.D. in 1921. In the Great War he served in France as medical officer of the Seventeenth Highlanders having enlisted in the R.A.M.C. in 1916. He was a member of Omega Alpha Honorary Medical Fraternity and of Nu Sigma Nu. He was one of the founders of the Medical Historical Society of Toronto. He was for a time Associate Professor of Physiology in the University of Toronto and held a similar appointment in St. Michael's College. He was also a Professor of Philosophy in the Jesuit Seminary.

Dr O'Sullivan was a man of rare gifts. He mastered half a dozen languages and read Latin like his mother tongue. In the Jesuit Seminary he lectured in Latin! It is doubtful if any other medical man in Canada ever attained a scholarship equal to that of Paul O'Sullivan. He was the most modest of men and only his intimates knew the depth of his learning. In medical history he could speak with authority. The range of his reading was universal. As a medical scientist he ranked high and was in charge of the laboratories of Christie Street Hospital when he died.

Paul O'Sullivan was never a pedant. He was a most lovable character and had a flair for friendship. His passing at so early an age is a shock to those who knew his quality and his ability. To his widow, his daughter and his son, the Fellows of the Academy offer sincerest sympathy in their bereavement.

Dr William Osler Abbott whose name all surgeons know in connection with the Miller Abbott tube died recently. He was a grandson of the late Chief Justice Osler of the Court of Appeals of Ontario, and a great nephew of Sir William.

He was a graduate of the University of Pennsylvania, and his world was done in the University Hospital and Laboratories. Osler Abbott ("Peter") turned to medicine easily his mother, the daughter of Judge Osler had managed the affairs of Sir William's household in Baltimore in its early years. There she met Dr Alexander Abbott who became one of the leading bacteriologists of his day. At the time of his marriage to Miss Osler he was called to the newly appointed chair of Hygiene and Bacteriology at the University of Pennsylvania.

(We are indebted to Dr Archibald Malloch for sending us the following extract of Dr Abbott, taken from Philadelphia Medicine, 1943 39 111)

The untimely death of Dr William Osler Abbott has deprived Philadelphia, and indeed America in medicine of one of its most promising intellects and most original personalities. It is perhaps an error to say that his intellect was promising his particular talents had in fact long since begun to flower and his future could hold an even richer promise of accomplishments to come.

Dr Abbott possessed a precious pair of attributes. He was at once a gifted clinician and an investigator of the first rank. In the practice of medicine he was a skilled observer and a careful thinker who never forgot that his patient was a total man. As an investigator he possessed the exploring intellectual force, the patience and the powers of inquiry observation and deduction which are prerequisite for the skilled scientist. His original contributions were chiefly in the field of astrobiology. They are perhaps best exemplified by his collaboration in the development of the Miller Abbott tube which has so greatly aided the needs of pleasant and physiologic and the treatment of intestinal obstruction. It was of recent interest to all that knowing his fate he should spend the last year in research on the malady to which he succumbed.

He was a kindly and cultured man, he and his parents were of refined and cultured ways. His collateral interests and learning, outside the field of medicine were large, particularly in history and the natural sciences. His private interests outside his work have centered about a wide and deep knowledge and love of things connected with the sea. He was an experienced and accomplished yachtsman of unusual skill.

It is not often that we find such rare talents and skills, such great personality combined in one man and it is truly indeed when such human talents from us too early.

He who conquers himself I.R.

Dr Cecil Duncombe Chapin aged 71 who practised in Brantford Ont. for 47 years died on October 6 after a long illness. He was born in Waterford the son of the late Lyman and Selina Chapin.

He graduated from the University of Toronto in 1895 and took a post-graduate course in New York. He was physician to hundreds and in some cases attended from the first to fifth generations of the same family.

He was medical officer of health for Brant County for many years was physician for the Brant County Home for the Aged and Infirm for 26 years medical officer of Salisbury Lodge Sons of England for more than 25 years and was medical officer of the 25th Brant Dragoons.

He served the Brant County Medical Association in various offices including the presidency and was also a past president of the staff of the Brantford General Hospital. In 1936 he was appointed representative of the medical association on the board of governors.

He was a long time member of the Brantford Rotary Club, and for some years was chairman of the children's committee

He was past president of the Brantford Golf and Country Club, and in 1929 was among those chosen to represent the Canadian seniors' golf team in Great Britain on the second visit to play the triangular match against British and United States teams

He was one of the most widely known members of the Masonic Order in the Brant district

Surviving are his widow and three daughters Dr O H Duncombe, Waterford, is an uncle

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Dr Angus Tyndall Condell, county coroner for the past thirty years, died at his residence in Brandon, September 14 Born in 1869 at Benarton, Ont, he taught school in Ontario, then came to the North West Territories at the age of 24 In 1899 he graduated in Arts from Manitoba College and in 1902 obtained his degree in Medicine He went to Brandon and practised there continuously He is survived by his widow, one son who is in the R C A F, and one daughter

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Dr Charles John Currie, a medical practitioner for more than 40 years in Toronto, died on September 27 Born in Toronto, he attended Jarvis Collegiate and graduated in arts and medicine from the University of Toronto, where he was prominent in athletics After graduation in 1901 he served as intern at the old Grace Hospital, and later was for several years chief of the maternity department

During the first Great War Dr Currie served on the medical boards at Niagara on the Lake, Long Branch, Camp Borden, Quebec City and Toronto After the war he was an examiner with the Dominion Pensions Board, and was for a number of years on the staff of the former Nursing at Home Mission, Hayter St, where he conducted clinics He was a member of Canada Bowling Club, the Academy of Medicine, the Ontario Medical Association, and Knox Presbyterian Church

He is survived by his widow, two brothers, and two sisters

Dr Augusta Stowe Gullen, wife of Dr J B Gullen, and Canada's first woman medical graduate, was buried on September 27 from Victoria University, Toronto, from which she graduated 60 years ago She died on September 23 at 461 Spadina Avenue, Toronto, which had been her home for the last half century

Dr Augusta Gullen, up to the time of her retirement from public life recently, was one of the best known women in Canada because of her activity in so many women's movements, particularly the long campaign for women's suffrage, which was introduced into Ontario by her mother, Dr Emily Howard Jennings Stowe (first woman to practice medicine in Canada), the National Council of Women, of which she was a founder, and the temperance movement

Dr Gullen was one of the original staff members of the Toronto Western Hospital and organized its Women's Board, of which she was president until 1926 She served on the Toronto School Board from 1892 to 1896, was vice president of the Ontario Social Service Council, honorary president of the Canadian Suffrage Association, member of the Ontario College of Physicians and Surgeons, and represented the medical profession on the senate of the University of Toronto She was a member of the University Women's Club, the Women's Canadian Club and the Lyceum and Women's Art Association

Dr Gullen was born in Norwich Oxford County, daughter of the late John Stowe and Dr Emily Howard Jennings Stowe, and took her course at the Toronto School of Medicine, graduating from Victoria (then in Cobourg) in 1883, later getting her degree from Trinity

At the opening of the Ontario Women's Medical College, she was appointed demonstrator of anatomy, later, lecturer in children's diseases, and subsequently professor of pædiatrics, which position she held until the Ontario Women's Medical College amalgamated with the University of Toronto In recognition of her services to the profession, the medical alumnæ of the University of Toronto presented an oil painting of Dr Gullen to the Academy of Medicine in 1929 She received the King's Medal in 1935

Dr Augusta Gullen and Dr J B Gullen (Trinity) were married immediately upon their graduation on May 23, 1883, the first wedding of medical doctors in Canada

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Dr Henry Hook Oldwright, son of the late Professor Oldwright, of Toronto, passed away in Edmonton on March 15 He graduated from Toronto University in 1891, and registered in Ontario the year of graduation After practising a number of years in St Catharines, Ontario, he came west and settled in Calgary in 1906 He remained there only a short time, as the west was filling up and needed physicians, he went to Stettler He went overseas in the last Great War and on returning, he practised at Donalda until his health gave out, when he retired

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Dr Thomas Alfred Patrick died on September 6, 1943, at the age of 79 years Born in Ontario, Dr Patrick graduated from the University of Western Ontario medical College in 1888, at the age of twenty four He practised in Michigan, U S A, for a year then in 1889 moved to Saltcoats, and finally to Yorkton in 1894

Dr Patrick, as one of the pioneer doctors of Yorkton and the surrounding district, covered a great deal of territory in the early days In addition to an active medical life he took a great interest in political affairs, and newspaper work He was a member of the N W T Legislature from 1897 to 1903 He was one of the originators of the local newspaper, *The Yorkton Enterprise* Dr Patrick was also a life member of the Saskatchewan Grain Growers Association

He is survived by a son, three daughters, three brothers, and four sisters

---

Dr Reginald Stirling Pentecost, surgeon in charge of the ear, nose and throat department at Christie Street Military Hospital, Toronto, and widely known medical man died on August 23 in Toronto Western Hospital He was 56 years old

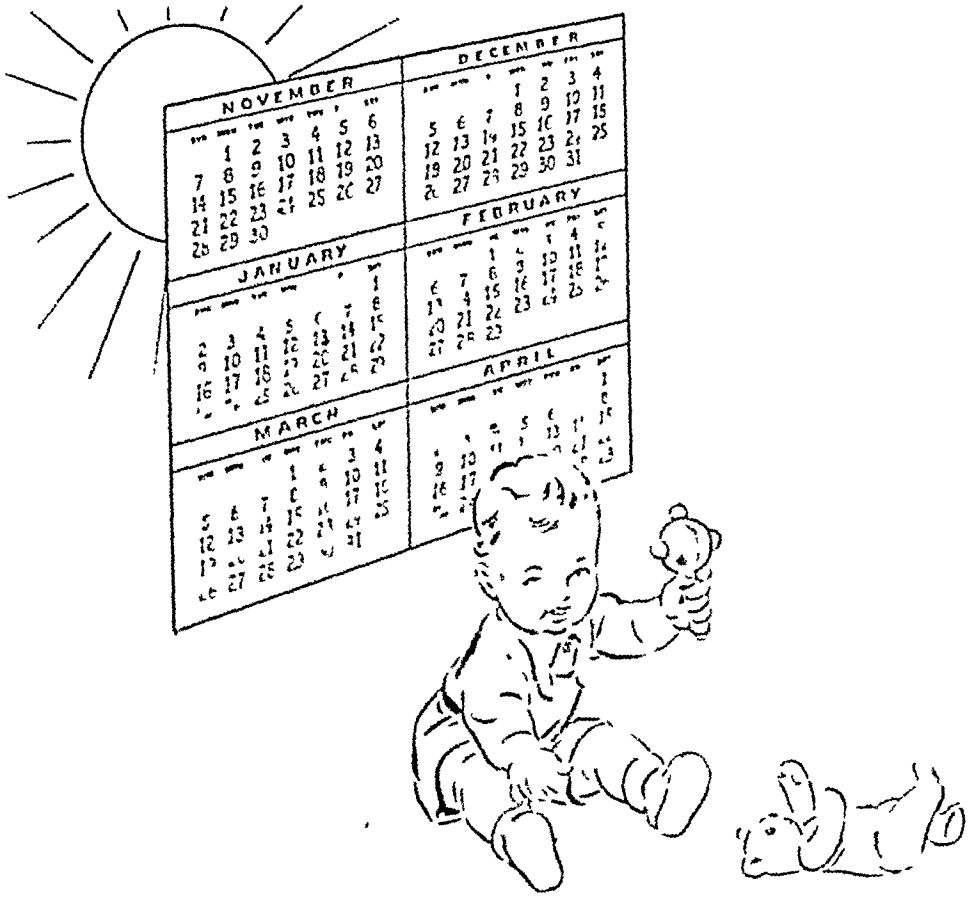
Born at Hamilton, he was known both in Canada and the United States as one of the foremost advocates of state medicine

Dr Pentecost was past president of the Toronto Academy of Medicine, a Fellow of the American College of Surgeons, and a Fellow of the Royal College of Surgeons of Canada He also was past chairman, of the ear, nose and throat section of the Ontario Medical Association

During his career he contributed a number of scientific treatises to Canadian and American medical journals He served overseas in the first Great War

He is survived by his widow and two daughters

American farmers are harvesting from 400 to 500 acres of belladonna this year, to replace supplies of this important drug plant formerly imported from central Europe —*The Diplomate*, 1943, **15** 267



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News Items

Manitoba

Maxwell M Wintrobe, M D, Ph D, Associate in Medicine, Johns Hopkins University, Associate Physician, Johns Hopkins Hospital, has been appointed Professor of Medicine in the University of Utah Dr Wintrobe, who has an international reputation in the field of hæmatology, graduated from Manitoba (B A), 1921, (M D), 1926, (B Sc), 1928 He was Gordon Bell Fellow 1926 1927 His book, "Clinical Hæmatology", was published in 1942

Dr E C Barnes who has served as Medical Superintendent of the Selkirk Mental Hospital for 25 years has resigned and will retire at the end of September He will be succeeded by Dr Edward Johnson, Assistant Superintendent Dr Barnes will reside at Victoria, B C

Reported to be the first in Canada to receive penicillin, O Olson, R C A F, is recovering from severe blood infection Four 50,000 unit cubes of the drug were brought to Deer Lodge Hospital from New Jersey by T C A plane and administration was begun July 21 The whole amount has now been injected and Col Nettleton reports that he is in better health He is endeavouring to get an additional supply

Dr C M Vanstone, who practised for many years in Wawanesa until he became managing director of the Wawanesa Mutual Insurance Company, has now resigned from the heavy duties of that office because of failing health For 21 years, 1922 to 1943, he directed the affairs of the company, but even from its inception in 1896 he was closely associated with the organization, a highly successful concern

Major G B McTavish, M C, who retired from active service at the end of August, was guest of honour at a dinner given by officers of No 10 Military District Depot, Fort Osborne Barracks on October 1 *Former medical officer of No 10 district depot, Major* McTavish was presented with a desk set on behalf of the officers by Lieutenant Colonel J Neish, officer commanding, who presided at the dinner

The town of Minnedosa voted strongly in favour of the municipal doctor by law The new municipal doctor will be Dr Ian Keith Gilhuly

Seven medical officers from M D No 10 (Winnipeg) have been attached to the A22 Canadian Army Medical Corps Training Centre, Camp Borden, Ont, where they are taking courses to qualify for promotion They are Major J L Downey, of Winnipeg, Lieuts Avard Fryer, Fort William, Alan H Brinsmead, Winnipeg, Clair F Benoit, Norwood, George A Waugh, Carberry, Man, John H Martin, Winnipeg, and Arthur C Stevenson, Winnipeg

Lieut J A Kristjansson MacDonnell, R C A M C, who has been serving as C W A C Medical Officer at Fort Osborne barracks, is being transferred to Vermilion, Alta, where she will be a member of the staff of Vermilion Military Hospital

Before leaving for Victoria, B C, where he will reside, Dr E C Barnes, who recently resigned as medical superintendent of Selkirk Mental Hospital, was the guest of honour at a dinner in Selkirk Hon James McLenaghan, Minister of Health and Public Welfare, presided and presented Dr Barnes with a silver tray as a token of appreciation from his friends

The finance committee of the Winnipeg city council voted unanimously to grant an extra $750 to enable Dr M S Lougheed, medical health officer, to carry on his tuberculosis surveys ROSS MITCHELL

New Brunswick

Dr P M Knox, Medical Superintendent of the River Glade Sanitarium is spending three months doing postgraduate study at Harvard Medical School

Among recent enlistments in the R C A M C at H Q M D No 7, Saint John, the following physicians appear, Drs Kenneth A Fraser, Henry O Tonning, Jas Fraser Keays, John B Downing, J S Wright, A D Lewis and L G Dewar These lieutenants had just completed their internships

Dr H S Everett, of St. Stephen, President of the N B Medical Society, C M A, N B Division has almost completed a Province wide visit to all branch societies In this tour he visited Moncton, Chatham, Shediac, Newcastle, Bathurst, Campbellton, Edmundston, Grand Falls, Hartland and Fredericton The results from this tour are to be presented at the fall meeting of the executive committee to be held in November

The promotion of Major R A H MacKeen to Lieutenant Colonel has been announced Colonel MacKeen was director of the N B Department of Health Laboratory *at Saint John before going overseas* where he has been up to the present O C of No 1 Canadian Mobile Bacteriological Laboratory

Major D F W Porter, now overseas, has been granted the Efficiency Decoration A S KIRKLAND

Nova Scotia

A new maternity home has been opened in Truro, in connection with the Colchester County Hospital Of 30 bed capacity, the home will help to ease hospital overcrowding

Dr R Evatt Mathers, Halifax, has been elected president of the Canadian Ophthalmological Society

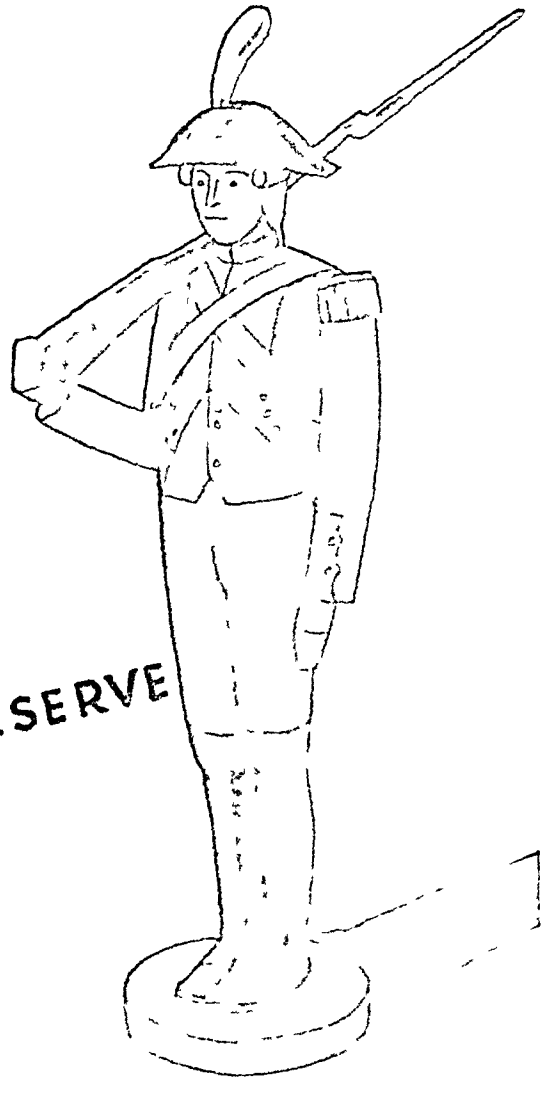
Dr W Earle Pollett, formerly of Sydney and New Germany, and now attached to the British Medical Service, in Edinburgh, has been awarded a Fellowship in the Royal College of Surgeons of Edinburgh

Dr Lewis R Morse (Toronto, '36) is with the Royal Canadian Navy Dr Morse, who practised in Lawrencetown for 3 years with his father, Dr L R Morse, had just completed two years in Urology at the Royal Victoria Hospital before going on active service

Several Halifax doctors have had tires stolen from their cars, stolen, no doubt, by thieves with consciences, who knew the privileged physicians could get new ones ARTHUR L MURPHY

Ontario

The opening meeting of the Toronto Academy of Medicine in the current session was held on October 5 One hundred and twenty five Fellows of the Academy attended the dinner in Osler Hall The guests included the Lieutenant Governor of Ontario, the Mayor of Toronto, the President of the University of Toronto, the President of the Canadian Medical Association, the President of the Ontario Medical Association and Sir Robert Falconer former president of the University High ranking officers of the medical services in the Army, Navy and Air Forces were seated at the head table The President of the Academy, Dr Robin Pearse, presided and read his inaugural address A replica of the presidential badge was presented to the past president Dr Samuel Johnston Greetings were brought from the Hamilton Academy of Medicine and from the Academy of Dentistry

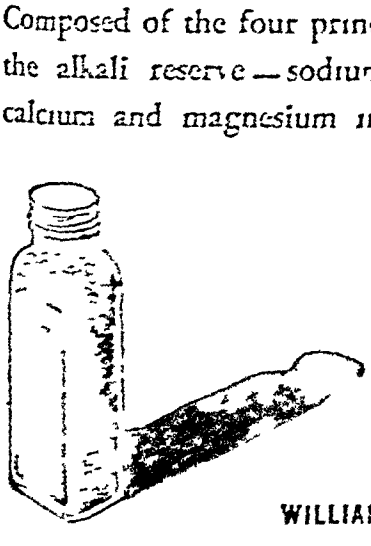


GUARDING THE ALKALI RESERVE

Maintaining the alkali reserve may call for active alkalization beyond what diet alone can provide. In such cases as in febrile conditions and during sulfonamide medication, the use of Alka-Zane will prove definitely helpful

Composed of the four principal bases of the alkali reserve—sodium, potassium calcium and magnesium in the readily assimilable forms of carbonates citrates and phosphates, Alka-Zane serves the dual purpose of alkalization and fluid intake A teaspoonful of Alka-Zane in a glass of water or added to fruit juices or milk, makes a zestful, refreshing drink

To determine for yourself how efficient and pleasant-to-take Alka-Zane is, may we suggest that you write for a complimentary supply?



ALKA-ZANE

WILLIAM P. WAPNER & CO., LTD., 727 KING ST WEST, TORONTO, ONTARIO

Lt Colonel D Kapelle has been retired from his command in Hamilton Military Hospital under the regulations regarding age limit The acting O C in this hospital is now Lt Col G H Ryan

Lt Col D A Warren formerly, O C in Toronto Military Hospital, Chorley Park, has gone overseas in command of Canadian General Hospital No 2

Captain Brayley has been recalled from overseas duty and is officer commanding in the new retraining centre in Oakville

Mr John Harold has resigned his appointment as chairman of the Workmen's Compensation Board of Ontario Under Mr Harold the relations of the Board and the medical profession have been singularly free from friction and the best wishes of a host of doctors will go with Mr Harold as he gives up work in which he has been very successful

M H V CAMERON

Quebec

Gifts, grants and bequests totalling $215,148, have been formally acknowledged by the board of governors of McGill University Important aid was received for psychiatry, research and scholarships

Heading the list of donations was one of $150,000 from the Rockefeller Foundation, consisting of $30,000 a year for five years for support of the department of psychiatry

Research work being carried on under the direction of Dr Hans Selye, associate professor of histology, is being aided by a total of $50,000 over a five year period from Gelatin Products, Limited, and Frank W Horner, Limited

The research is directed specifically at improving bodily resistance to all types of strain to which members of the armed forces are subjected The research centres around the adrenal cortex

The university's growing list of scholarships is being enlarged by one made available by a legacy of $25,000 from the late Arthur C Tagge, the money to be used to found a scholarship in some faculty selected by the governors of the university

There were two substantial anonymous grants in aid of research work being carried on at the university

A large committee is attempting to trace the present addresses of all who attended Montreal High School Plans are under way to compile a Book of Remembrance to be installed in a Memorial Room to be constructed after the war, in honour of those who fell in the last and present wars Former scholars are asked to send their names and present address to Thomas Sommerville, M A , Rector, High School of Montreal, 3449 University Street, Montreal, Que

Dr Jules Gilbert, Director of Public Health Education, with the financial assistance of the Ministry of Health, Quebec, is collaborating with six teaching Orders to send five brothers and two fathers to the Department of Public Health of Yale University School of Medicine for one year's training in health education and public health On their return to Quebec they will devote themselves primarily to school health education work in the normal schools of their respective Orders, in conjunction with the Ministry of Health

The following is the table of contents for *Revue Canadienne de Biologie* for August

Eugène Robillard —Elie Georges Asselin

Carlo Foâ et Ubirajara Monteiro —Les facteurs constitutionnels de cancer etudies sur des rats par la méthode de la parabiose

Hans Selye and Eleanor Beland—The development and repair of organ changes induced by steroid compounds

Charles Oberling —Considérations sur l'etiologie de quelques processus dégénératifs des substances fondamentales (dégenerescence hyaline, fibrinoide et amyloide)

Hans Selye and Eleanor Clarke —Potentiation of a pituitary extract with Δ⁵-pregnenolone and additional observations concerning the influence of various organs on steroid metabolism

Carl C Seltzer —The value of the shoulder hip ratio as an index of masculinity and its relation to dynamic physical fitness

A Desmarais, L P Dugal et C P Leblond —Effet de l'ablation partielle du foie sur la resistance au froid et à la chaleur

B P Babkin and M B Bornstein —The effect of swinging and of binatural galvanic stimulation on the motility of the stomach in dogs

R L Stehle and K I Melville —The rate of urine secretion in the dog following the administration of mercuric chloride and dextrose solutions

Le Dr Georges H Baril, vice doyen de la Faculte de medecine de l'Université de Montreal vient d'etre nommé president du Dominion Medical Council

Le Dr Alphonse Bernier, autrefois anatomo pathologiste à l'hôpital Notre Dame a accepté la direction des laboratoires d'anatomie pathologique de l'hôpital St Luc de Montréal

La bénédiction et l'inauguration officielle du nouvel hôpital St Michel Archange de Quebec a eu lieu le 29 septembre dernier On se rappelle que l'ancien hopital avait été détruit par le feu il y a quelques annees L'hôpital St Michel Archange est une institution psychiatrique pourvue de toutes les ameliorations modernes Il abrite plus de 2,000 malades et dessert la region de Québec Il est le centre universitaire d'enseignement psychiâtrique

JEAN SAUCIER

General

The Pan American Congress of Ophthalmology which was to have been held in Montendeo, November 4 to 9, 1943, has been postponed until November, 1944 The program will remain the same as for the 1943 meeting

Book Reviews

Skin Grafting of Burns J B Brown and J McDowell 204 pp , illust $6 00 Lippincott, Montreal, 1943

This work follows the burn victim from the first aid station to his return as a normal member of society As with the patient's and the surgeon's time, the greater part of the book is thus devoted to skin grafting, and the restoration of function to the burned parts

The early general care of shock, toxæmia, and sepsis having been adequately presented, the authors show themselves to be in the same state of flux as most other surgeons regarding primary, local treatment They do believe that the sealing of burns under an impermeable membrane should be done only when there is little or no dead tissue left to serve as a culture medium

Coming to the technique of skin grafting, the preparation of the wound, the application of split skin, free full thickness, and pedicle grafts, the complications and regional problems, the authors are most precise, and generous in their detail Their methods are surgically sound and, most important, they are their own They have recorded only those procedures with which they have had first hand experience, and the procedures seem ample to cover any problem in the plastic surgery of burns Like most surgeons who have learned graft cutting the hard way, the authors show a very tempered enthusiasm for the Padgett

Every baby needs this help to build

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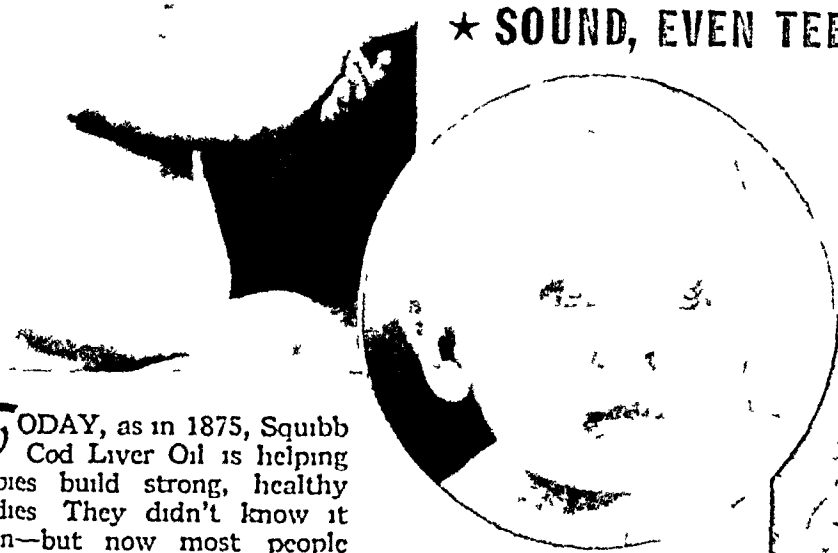
★ A WELL-SHAPED HEAD
★ SOUND, EVEN TEETH



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dermatome, and the photographs of their accomplishments with the open blade justify their stand Great stress is laid on the postoperative dressings and care, where the effect of good operative work is so often ruined The book concludes with a chapter on the treatment of burns in World War II

The book fills a gap in surgical literature It is sound, practical and highly recommended

Surgical Care, A Handbook of Pre- and Post-operative Treatment R W Raven 271 pp, illust $3 00 E Arnold, London, Eng, Macmillan, Toronto, 1942

This book has for its subtitle "A Handbook of Pre and Post operative Treatment" As such it fulfills its purpose admirably Its usefulness, however, would depend upon the training of the person who would take it as a guide It includes operations of general surgery, gynæcology, ophthalmology, otolaryngology, as well as those of thoracic, genito urinary and brain surgery Condensation is therefore carried almost to the limit For example, the subject of surgical shock is treated in twelve pages A book on this subject by the same author runs to 196 pages!

The methods advised are sound and sensible The reviewer objects to draining a common bile duct by a long tube to a bottle beside the bed There are other ways of doing this that will allow the patient to move about This is the only instance of definite disagreement

The little book can be warmly recommended to junior surgeons and hospital interns and would be very useful to senior students It is an excellent handbook, but not quite a textbook on surgical care

Pictorial Handbook of Fracture Treatment E L Compere and S W Banks 351 pp, illust $4 25 Year Book Publishers, Chicago, 1943

This latest addition to the General Practice Manuals should serve as a handy reference book for the intern or the physician in general practice who is called on occasionally to treat fractures It is modern in its concepts of fracture production and in its therapy The line sketches and x rays illustrating the book are profuse and most informative

The first third of the book is devoted to general fracture therapy, two thirds to the specific injuries Diagnosis and therapy of each fracture are presented in brief, tabulated form with adequate detail One method of treatment is given for each condition, and this is usually the one most generally accepted Orthopædic procedures for cases of malunion and non union complete the chapters

To write a book of this kind without digressing from bare essentials into more interesting intricacies must be difficult, and the authors have taken several extra, good pages on the problems of the hip Perhaps that is why they rushed past that more common fracture site, the ankle joint, with such scant consideration, almost neglecting the rotations of the foot, most important of the movements in fracture production and therapy Many fracture surgeons will wonder too, at the lack of stress of the unpadded cast, and the absence of pronation as a step in the reduction of the Colles' fracture

In the sphere for which it is designed, the book should prove useful

Outline of Roentgen Diagnosis L G Rigler 2nd ed, 323 pp, illust $7 50 Lippincott, Montreal, 1943

The title of this book is self explanatory and the reader must not expect to find any more than a "synopsis of a very extensive subject" that of roentgen diagnosis

It is comforting to find that the authors have made several additions to the first edition in order to render their book up to date The use of tomography and kymography have been introduced The usefulness and limitations of those methods have been stressed

Considerable clarity and concision are predominant features No place has been found for speculation and only what may be considered as definitely acquired facts has been included Differential diagnosis is well elaborated

The last part of the book is devoted to a pictorial atlas presenting roentgenograms, teaching drawings and schematic diagrams to which ready references are made throughout the text It is felt, however, that some drawings regarding bone pathology could have been supplemented advantageously by roentgenograms also

For those who know something already about roentgen diagnosis this book should be very useful for a quick review, while for the students the schematic form in which the subject is presented should prove to be of definite help in learning

Clinical Roentgenology of the Cardiovascular System. H. Roesler 2nd ed, 480 pp, illust $10 25 Thomas, Ill, Ryerson, Toronto, 1943

Every cardiologist and radiologist should have this book in his personal medical library and read it from the beginning to the end The study of the cardiovascular system depends no longer on clinical and sphygmomanometric examinations only In modern medicine special laboratory examinations, namely electrocardiology and roentgenology are indispensable adjuvants

The author has made this Second Edition more complete still than the first by adding to the text and increasing considerably the number of illustrations and references One finds a very elaborate description of all the various methods and techniques of examination of the cardiovascular system roentgenologically, especially with the use of contrast media

The use of roentgenology is detailed in every possible type of cardiovascular pathology in relationship with the other laboratory and clinical examinations throughout this excellent and well illustrated textbook

The Diagnosis of Uterine Cancer by the Vaginal Smear G N Papanicolacu and H F Traut 46 pp, illust $3 00 The Commonwealth Fund, New York, 1943

Until now the diagnosis of uterine cancer has been based on tissue surgically removed from the uterus or cervix This book describes a more simple diagnostic procedure, *i e*, a study of the morphology of the exfoliated cells found in the vagina It is based on the examination of vaginal smears routinely carried out on all patients admitted to the Women's Clinic at the Cornell University, New York Hospital Centre, together with smears obtained from the Memorial Hospital and the Women's Hospital, a total of 3,014 women

It would seem that the criteria of malignancy outlined by the authors are sufficiently characteristic to be of diagnostic value and in actual practice the vaginal smear has revealed the presence of practically all cancers of the uterus which could be detected clinically and by means of tissue diagnosis In addition it has revealed a group of early lesions which could not be seen and would therefore have been missed at this early stage

The obtaining of the material and staining of the smears are simple procedures and could easily be carried out in any gynæcological clinic, but the examination and evaluation of the smears call for specialized training and experience, however, any procedure which may lead to the discovery of early cancer should not be neglected, and the examination of the vaginal smear may well become a routine laboratory procedure

The book is exceptionally well produced and the coloured plates excellent It demonstrates the modern tendency to study cells themselves apart from their relationship to surrounding tissues Virchow's criterion of malignancy was the invasion of these tissues, the method here described makes diagnosis possible before such invasion takes place and is the result of the recent discovery that pre invasive phases in the life cycle of cancer can be recognized by minute changes in the cells themselves

DIPHTHERIA TOXOID AND PERTUSSIS VACCINE (COMBINED)

The death rate from diphtheria and whooping cough is highest among children of pre-school age It is desirable, therefore, to administer diphtheria toxoid and pertussis vaccine to infants and young children as a *routine procedure*, preferably in the first six months of life or as soon thereafter as possible

For use in the prevention of both diphtheria and whooping cough the Connaught Laboratories have prepared a combined vaccine, each cc of which contains 20 Lf's of diphtheria toxoid and approximately 15,000 million killed bacilli from freshly isolated strains (strains in Phase 1) of H pertussis

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IMMEDIATE RESULTS:

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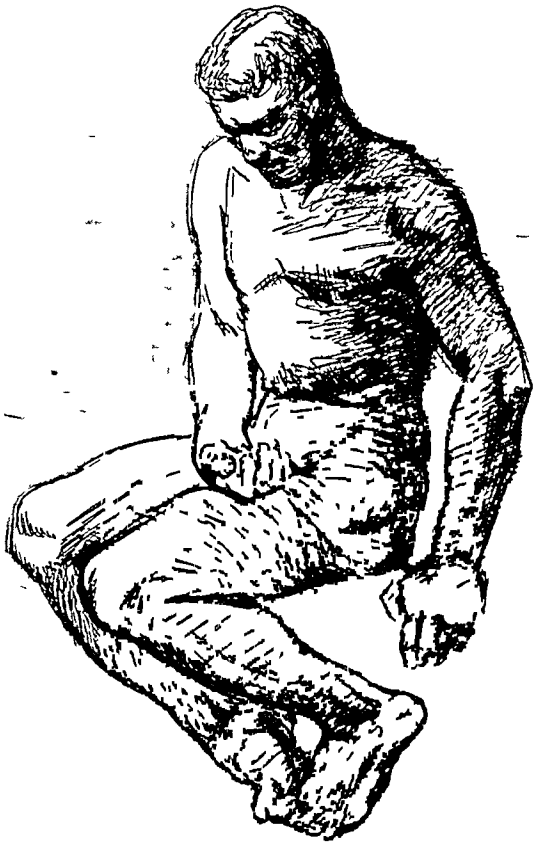

"The immediate effects of benzedrine sulfate have been studied in 100 cases in which there were disorders of mood (chiefly depression), chronic nervous exhaustion and pyschoneurosis In about 80 per cent of the cases of chronic exhaustion or depression the immediate results were favorable, and in some instances spectacular, leading to complete relief of exhaustion, to marked exhilaration, and to increased capacity for physical and mental effort" Wilbur, D L, MacLean, A R and Allen, E V —Proc Staff Meet Mayo Clinic, 12 97, 1937

The quotation above is characteristic of the literature on Benzedrine Sulfate therapy in depressive states

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...ment of burns may come ... appears from the report of Dr J W Beard of Duke Uni-

... the fruit and leaves of the papaw or papaya tree, contains an ... which helps remove damaged tissue ... the scientists found Papain by ... effective but when combined with an ... stone its action is increased Addi- ... sulphate, close relative of aspirin ... injured tissues more susceptible to the ... action—*Science News Letter* Sep ... 1943

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The maintenance and restoration of adequate hemoglobin levels in pregnancy, postpartum and lactation are of paramount importance Precautionary measures to avoid deficiency anemias should include reliable iron medication Thus, iron reserves needed by mother and child can be satisfactorily provided by the administration of specially prepared iron (easily assimilated ferrous sulphate—plain or with liver concentrate) incorporated in

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The Council on Pharmacy and Chemistry of the American Medical Association accepted, over a year ago, [1] (J A M A, June 20, 1942) the use of diethyl stilboestrol, for the following conditions

Senile Vaginitis — *Kraurosis Vulvae*
Gonorrhoeal Vaginitis — *Infantilism in Women*
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[1] Since the above report was published, extensive research, in U S A particularly, is corroborating the findings of earlier investigators that the oral administration of diethyl stilboestrol and its derivatives is of definite value in treating Suppression of lactation, breast engorgement, dysmenorrhoea, amenorrhoea, habitual abortion, hypersexuality in the male, and prostatic neoplasms

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WASSERMANN FASTNESS

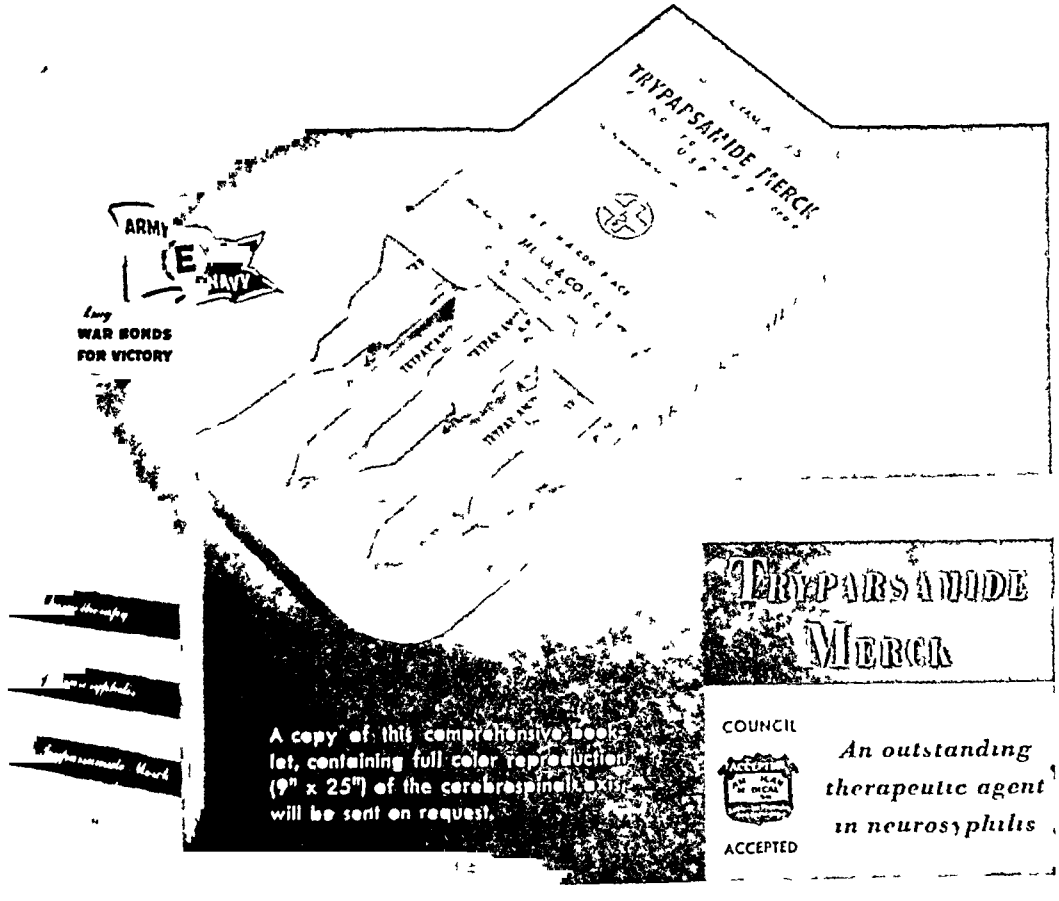
(SERORESISTANT SYPHILIS)

"Seroresistance is associated with a high proportion (about 40 per cent), of asymptomatic neurosyphilis"

Management of Syphilis in General Practice U S P H S Supp No 6 to Venereal Disease Information p 60, Oct 1939

In every instance of seroresistance in early syphilis, the spinal fluid of the patient should be examined or re-examined as the case may be Disclosure of involvement of the cerebrospinal axis indicates that this may be the cause of the seroresistance

Tryparsamide Merck has an unusual power of therapeutic penetration in case of the central nervous system Consideration of the employment of Tryparsamide Merck is suggested in the treatment of all patients with neurosyphilis



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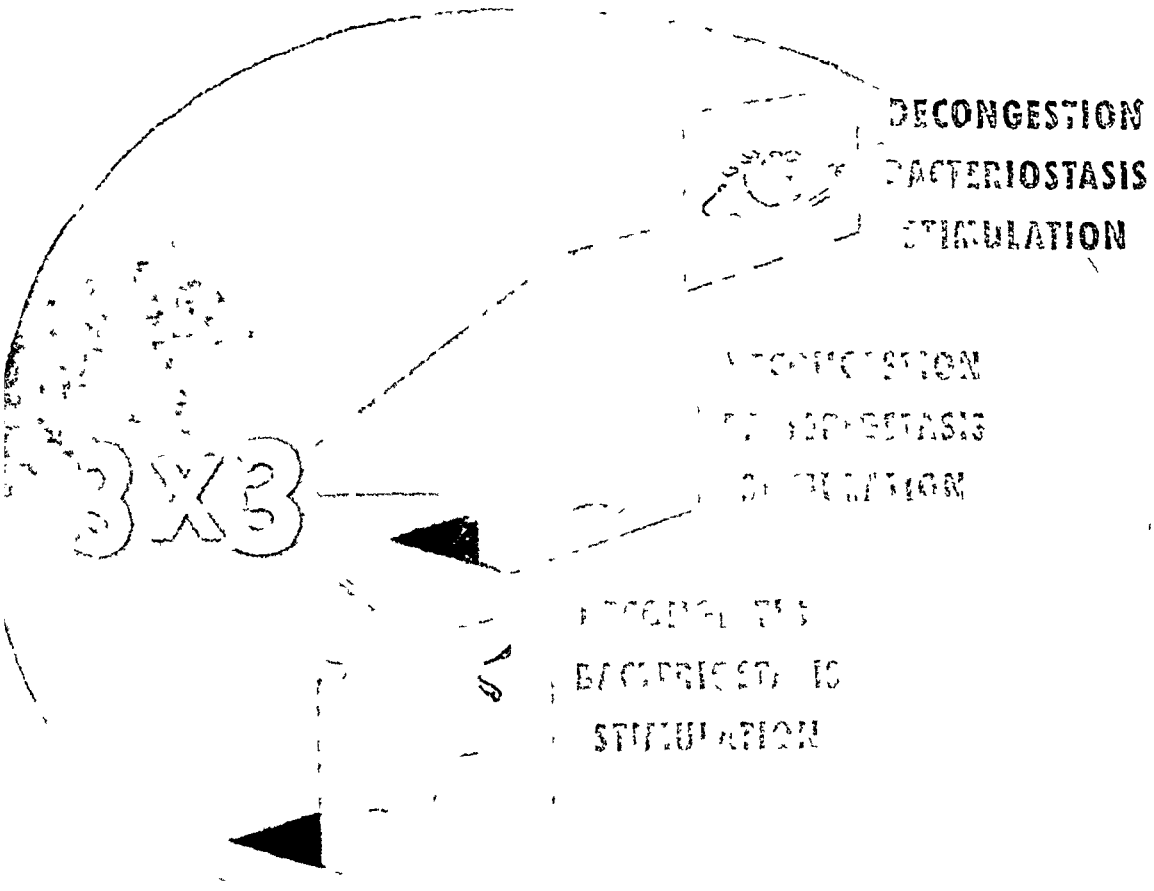

ONLY CONTRA-INFECTIVE—There are important properties in addition to bacteriostasis which make ARGYROL the "Physiologic Antiseptic"—one which works in harmony with normal defense functions of tissues, nerves, cilia and circulatory system Of first importance is the fact that ARGYROL is both antiseptic and decongestive

ONLY CONTRA-CONGESTIVE—There is an EXTRA FACTOR in mucous membrane antisepsis, decongestion with ARGYROL This important factor is physiologic stimulation of tissue use function It is a combination of physico-chemical and bacteriostatic properties which are beyond the usual concept of what an antiseptic should do For

ARGYROL IS DETERGENT · PROTECTIVE · PUS-DISLODGING · INFLAMMATION-DISPELLING · SOOTHING · STIMULATING TO GLANDS, TISSUES.

MADE ONLY BY THE A. C BARNES COMPANY LIMITED, STE THÉRÈSE, QUE.

ARGYROL FOR PHYSIOLOGIC STIMULATION OF TISSUE DEFENSE FUNCTION

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REPLACING MILLIONS of TIN TUBES . . safeguarding health of nations

THE Rotary Die Process of making Gelatin Capsules, Tubes and Enclosures of all shapes and sizes was perfected at a time when it could be of great value in helping win the war

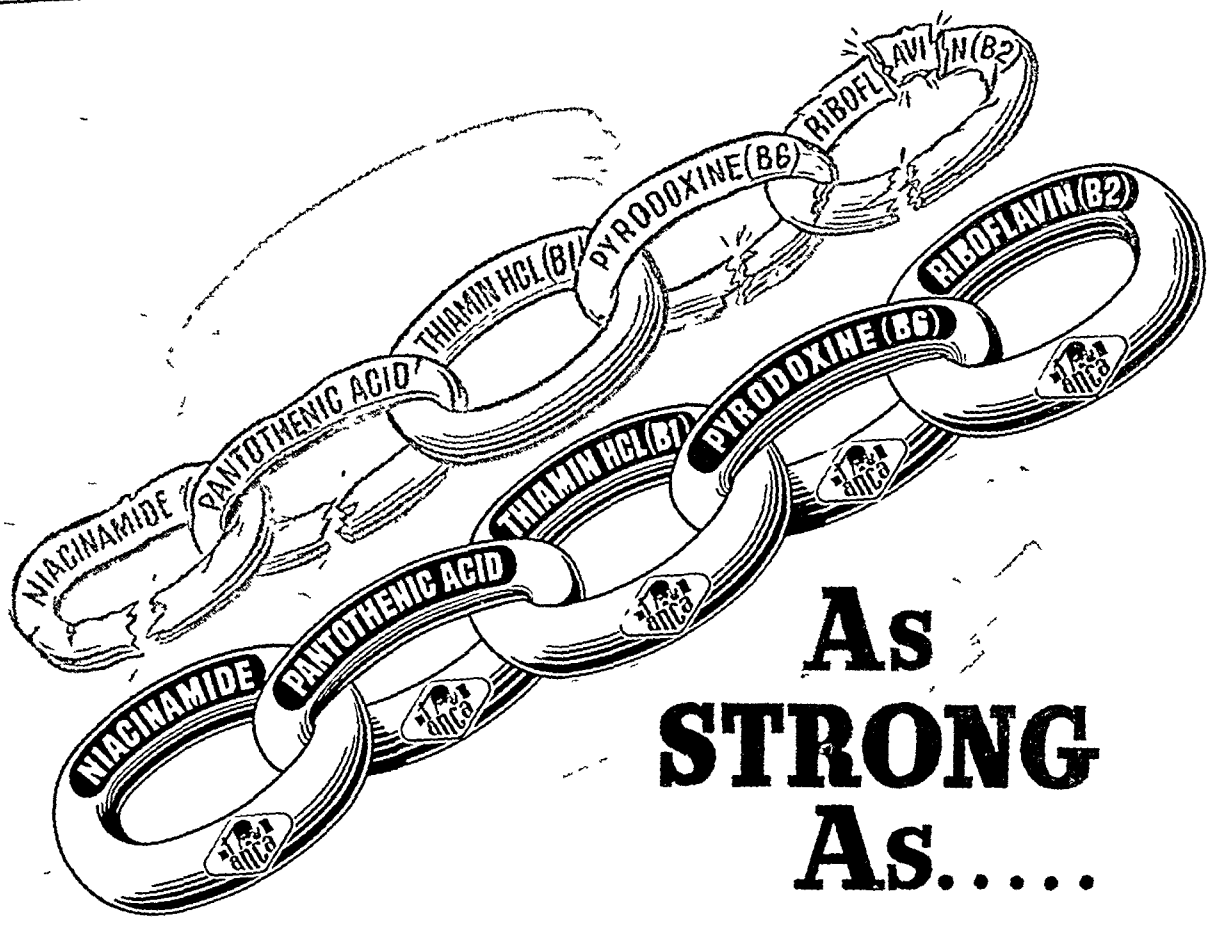
They are providing uniformly accurate closures for vitamins and medicines — in Britain, Canada, Australia, New Zealand, China, Russia, the U S A — wherever Allied battle flags fly

They are keeping general health and morale higher than might be expected — with greater efficiency in the armies, navies and air forces — and steadier production of war materials And they are saving millions of tin tubes

SERVING THE PHARMACEUTICAL INDUSTRY

GELATIN PRODUCTS Ltd. WINDSOR · ONTARIO

Associated with GELATIN PRODUCTS LTD, SLOUGH, ENGLAND and GELATIN PRODUCTS CO, DETROIT, MICH

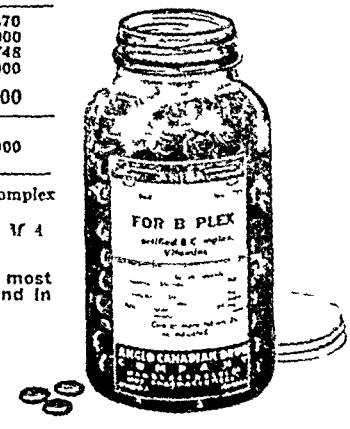


As STRONG As.....

RECENT Vitamınology has proved the B Complex "chain" as strong only as its weakest therapeutically established factor The following chart will illustrate

Various B-Complex Products	Number of micrograms per tablet, capsule or 4 c c dose of				
	THIAMIN	RIBO-FLAVIN	PYRO-DOXINE	PANTOTHENIC ACID	NIACINA-MIDE
Tablet A	3 300	150	150	275	8 370
Capsule B	1,000	250	130	140	5 000
Liquid C (4 c c)	1,500	600	200	1,120	5 748
Tablet D	1,500	500	100	184	4,000
FOR-B-PLEX Tablet (Anglo-Canadian)	3,000	3,000	1,000	2,000	25,000
AVERAGE DAILY REQUIREMENT	2,300	3,000	750*	1 500*	20,000

emphasize the importance of having ADEQUATE AMOUNTS of ALL B Complex
HIAMIN' (*C M A Journal* May 1942)
along with BALANCED amounts of the various B Vitamins are essential (*Journal A M A* May 2 1942)



FOR B PLEX Tablet is offered to the profession as, what we believe the most POTENT, scientifically BALANCED and ECONOMICAL preparation of its kind in the pharmaceutical mar et today

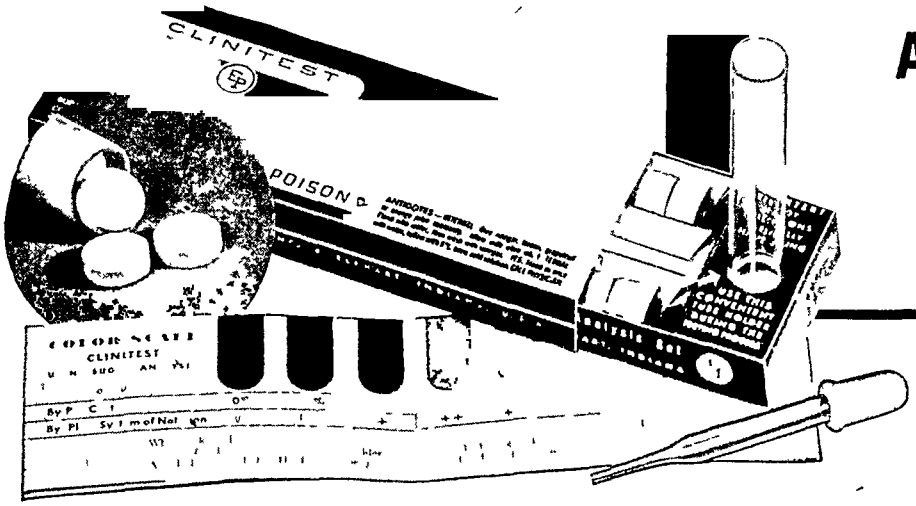
*Not yet definitely established

— Please write us for trial packages —

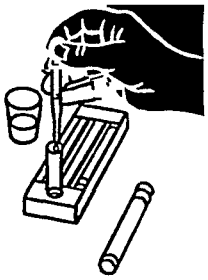
Anglo-CANADIAN DRUG Company
OSHAWA CANADA

One hundred per cent Canadian

MANUFACTURERS OF FINE PHARMACEUTICALS



A COMPACT COMPLETE TEST KIT..



New quick, simplified

URINE-SUGAR TEST

CLINITEST

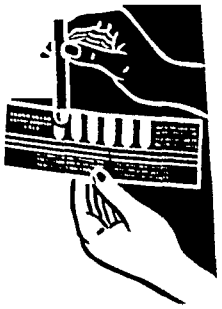
URINE-SUGAR ANALYSIS TABLETS

NOTE THESE PRACTICAL ADVANTAGES

A test can be made in less than 1 minute
No complicated equipment
No heating
No liquids or powder to spill
Small, compact, portable in pocket or bag

❶ 5 drops urine *plus* 10 drops water

❷ Drop in tablet.



❸ Allow for reaction and compare with color scale.

And Clinitest is Reliable

The chemistry underlying the Clinitest *Tablet* Method is essentially the same as that involved in the well known copper reduction methods of Fehling and Benedict It retains the familar progression of colors from blue through green to orange, and indicating sugar (glucose) at 0%, ¼%, ½%, ¾%, 1% and 2% plus

Economical

Complete set (with tablets for 50 tests) costs pat[illegible]ient only $2 00 Tablet Refill (for 75 tests) $2 00 Wri[illegible]te for full descriptive literature

Available through your surgical supply house or prescription ph[illegible]armacy

EFFERVESCENT PRODUCTS INC.

Sole Canadian Distributors

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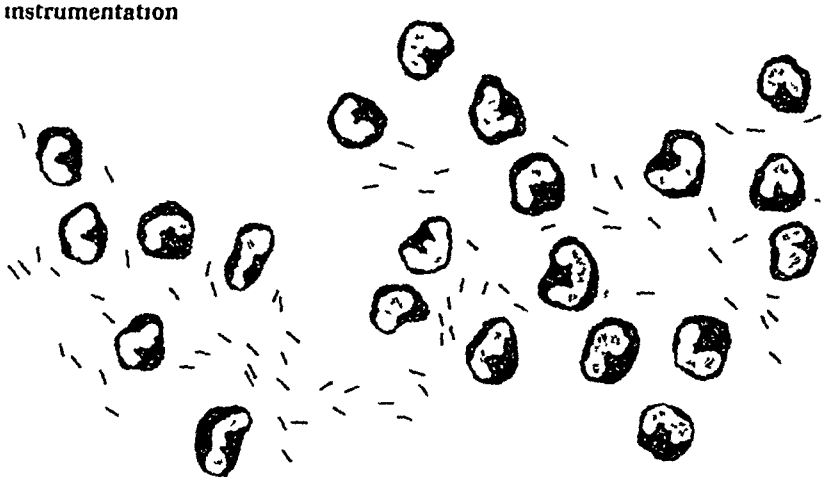
MOST URINARY TRACT INFECTIONS YIELD TO

SULAMYD

SULAMYD (Sulfacetimide-Schering) *is* "*almost* a specific" in the *treatment* of urinary tract infections — especially those due to B coli, the commonest invading organism

SULAMYD is effective in small dosage, is better tolerated, and is convenient to use Recent evidence indicates SULAMYD is of value for *prophylaxis* pre- and postoperatively in genitourinary surgery, and in urinary tract instrumentation

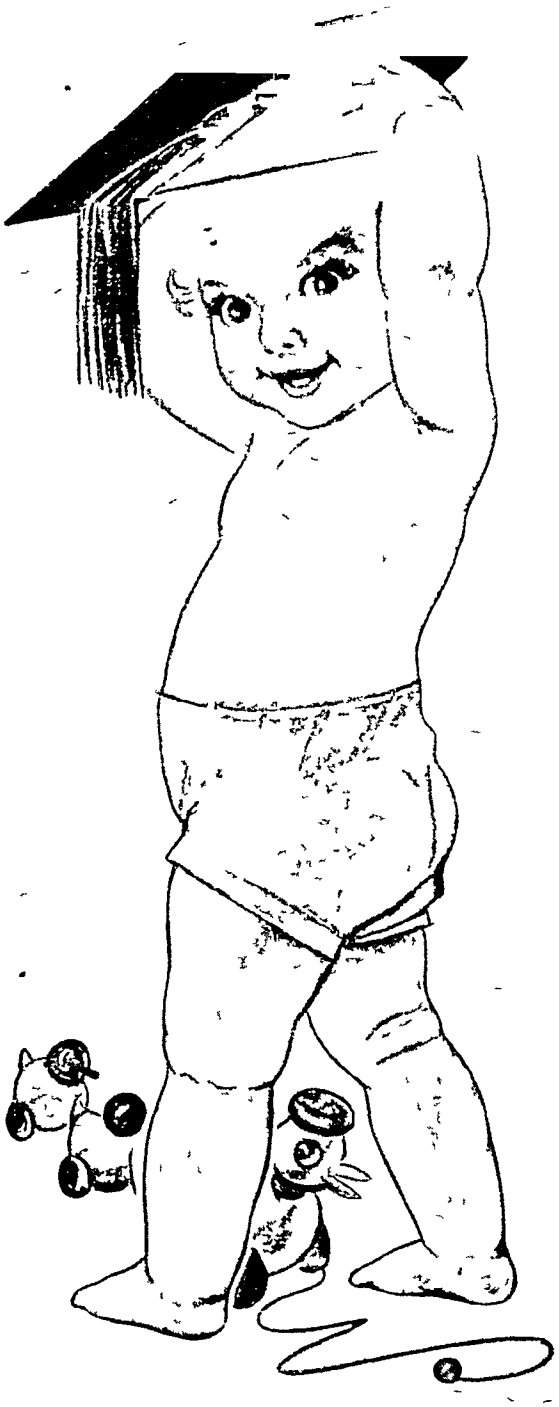


SULAMYD (Sulfacetimide-Schering) is available in bottles of 100 and 1000 tablets, 0.5 Gm each

SCHERING

SCHERING CORPORATION LIMITED
137 St Peter St , Montreal

When baby graduates



WHEN the formula-fed infant starts drinking milk from a cup, or when the breast-fed infant is weaned, Irradiated Carnation Milk admirably meets the milk requirements of the growing child

Sterility, soft-curd quality, lessened antigenic properties, and uniform nutritiousness (with increased vitamin D) especially recommend this milk Economy and availability are also important

In a 1·1 (whole-milk) dilution, Carnation is a palatable drinking milk for children In cookery, it may often be used up to full strength, greatly increasing the milk solids per serving Milk-rich desserts made with Carnation are notably appetizing

Physicians are invited to write for "Continuing After Weaning With Irradiated Carnation Evaporated Milk," an authoritative new publication for the medical profession *Carnation Company Limited, Toronto, Ont*

IRRADIATED

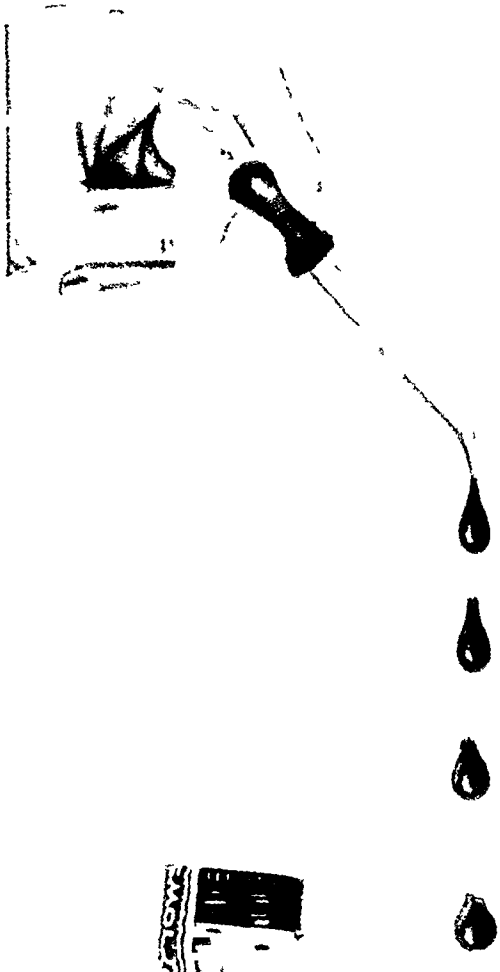
Carnation Milk

"FROM CONTENTED COWS"

A Canadian Product

IODAMINOL

A NEW IODINE MEDICATION



Iodaminol is a compound of iodine and amino-acids It is a preparation in which the iodine is completely utilizable by the organism

Each tablet contains 0 01 gm of iodine and is the equivalent of four drops of Lugol's solution A vastly superior utilisation of iodine is assured with Iodaminol

Prevention of simple or endemic goitre
Treatment of colloidal goitre, metabolic disturbances, arthritis, infections

DOSE Three to six tablets a day between meals

Bottles of 100 tablets

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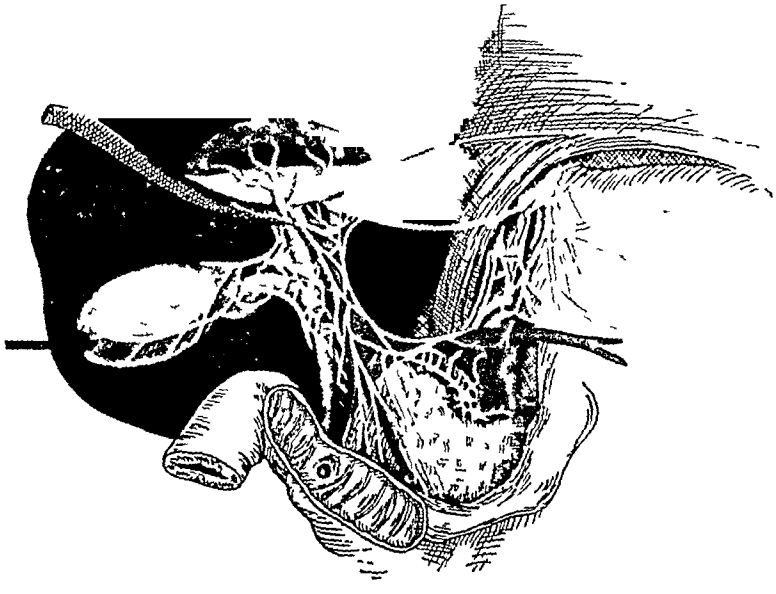
Agobyl drains the Gallbladder!

Choleretics act on the liver but do not empty the gallbladder



Agobyl primarily empties the gallbladder

Agobyl — a true cholagogue — effectively empties the gallbladder and brings about a medical drainage of the biliary tract It is also mildly choleretic

Biliary stasis except in severe mechanical obstruction toxic hepatitis hepatic torpor and insufficiency chronic passive congestion chronic cholecystitis and cholangitis respond to Agobyl therapy

AGOBYL is put up in boxes of 125 grams
(Soluble granules)

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PARTLY SKIMMED MILK IN INFANT FEEDING

Recent investigations* carried out by the Department of Pædiatrics, University of Toronto, have corroborated the advantages of a partly skimmed Evaporated Milk (Farmer's Wife Brand) over standard Whole Evaporated Milk. Two groups of infants were kept under control, one on regular Evaporated Milk, the other on Farmer's Wife (Partly Skimmed) Milk. The following is a summary of the results obtained

1. **The average gain in weight was greater on Farmer's Wife**
2. **On discharge from hospital, there was a greater gain over birth weight in the group fed on Farmer's Wife**
3. **There was a smaller incidence of feeding disturbances among infants on Farmer's Wife**

Farmer's Wife Milk is an Irradiated Evaporated Milk with 4% butterfat which when diluted with water presents a milk with 2% butterfat. Every stage of its manufacture and packing is carefully controlled

Farmer's Wife Milk makes available to the Medical Profession another important Milk Food in the field of pædiatrics

*Snelling, L. C. The Uses of Evaporated Half Skimmed Milk in Infant Feeding. *C. M. A. Journal* 1943, 48, 1, P. 32

COMPOSITION

Fat	4.0%	**Total Solids**	22.0%
Vitamin D		324 International Units per Imperial quart	
Calorific value per ounce	32		

Clinical samples and literature will be gladly sent on to any member of the Medical Profession

Farmer's Wife

IRRADIATED MILK

PARTLY SKIMMED—UNSWEETENED

SPECIALLY PREPARED FOR INFANT FEEDING

COW & GATE (CANADA) LIMITED GANANOQUE, ONT.

TWO-FOLD FUNCTION OF *Dillard's* Aspergum

in "sore throats," in pharyngitis, tonsillitis and following tonsillectomy

1 *Prolonged and immediate contact by effective analgesic with pharyngeal and tonsillar areas* Chewing Aspergum, the patient releases a soothing flow of saliva, laden with acetylsalicylic acid, which laves pharyngeal folds often not reached even intermittently by gargling or irrigation Traumatized oral and pharyngeal tissues are kept soft and moist and less sensitive to pain

2 *Gentle stimulation of muscular action greatly helps to relieve local spasticity and stiffness*— produces the oral detergent effect of increased salivary flow and promotes lymph drainage

APPEALS TO CHILDR[illegible]

Aspergum is, too, a particularly to provide analgesia in children as well as after tonsillectomy quently find it difficult to enjoy the tasty chewing gu brings the analgesic in cont areas

Each tablet of Dillard's 3½ grs acetylsalicylic a flavored chewing gum h moted—not advertised to th of 16, in moisture-proof bot

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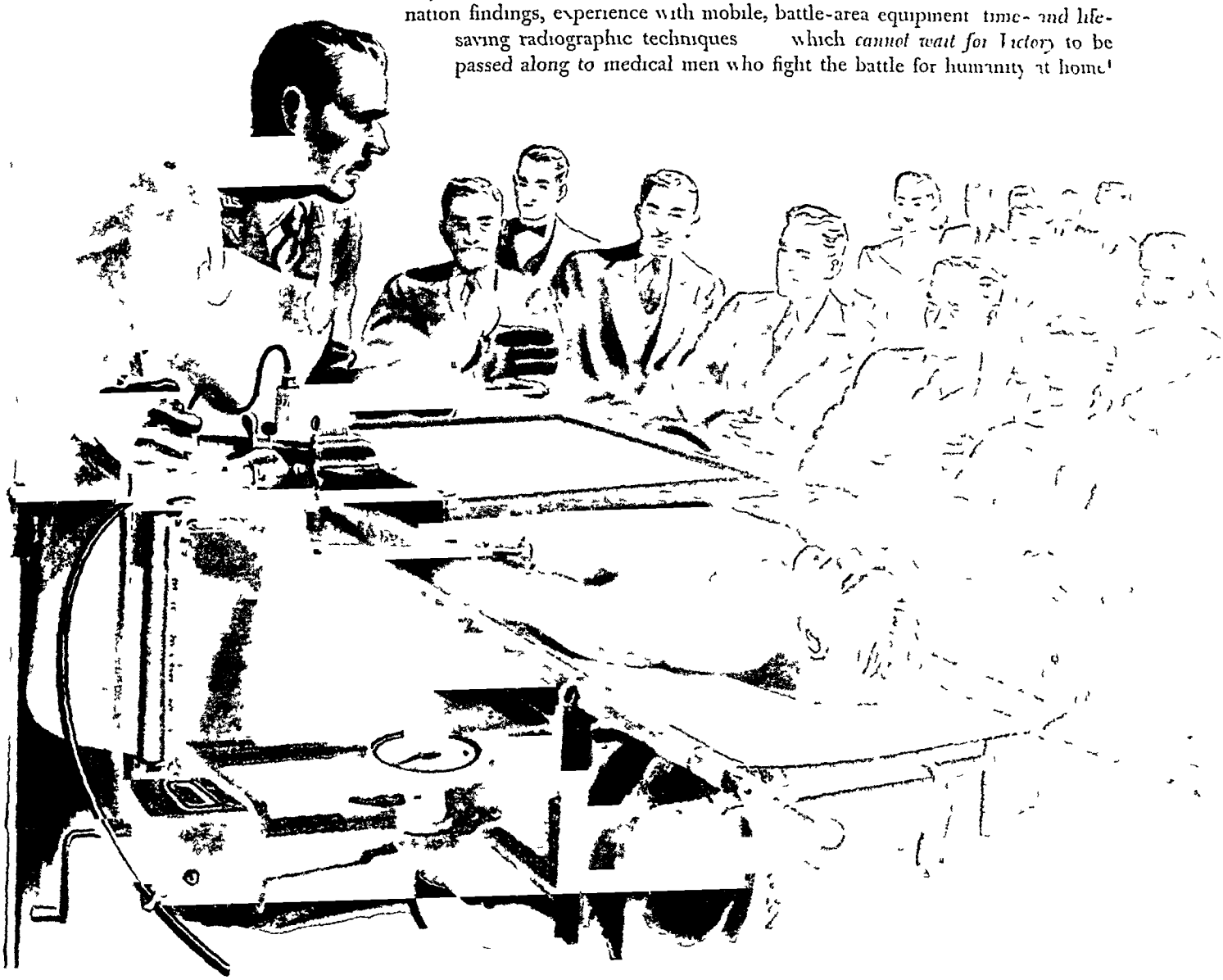
Dillard's **Aspergum**

Lessons learned *at war* . . .

FROM INDUCTION CENTER to front line dressing station, America's medical officers are utilizing the science of radiology and learning countless new ways to insure the health and safety of our armed forces. Mass X-Ray examination findings, experience with mobile, battle-area equipment, time- and life-saving radiographic techniques which *cannot wait for Victory* to be passed along to medical men who fight the battle for humanity at home!



We at Patterson are as humbly proud as men and women behind the battle lines can be to contribute knowledge and equipment to these war-born techniques. Our production of X-Ray Screens has been increased many fold to meet the demands of the armed forces without forgetting for one moment the importance of maintaining the unexcelled quality and adequate supply of our products for the home front. Come what may, there can be no faltering in our fight to check the inception and growth of disease.

Patterson Screens are available for immediate delivery

Patterson Screen Division of E. I. du Pont de Nemours & Co. (Inc.) Towanda, Pa.

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Patterson Screens *Light the paths of X-Ray*

BETTER THINGS FOR BETTER LIVING THROUGH CHEMISTRY

3 REASONS WHY

PAREDRINE-

is a Revolutionary

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'Micraform' Sulfathiazole

'Micraform'* crystals of sulfathiazole — approximately 1/1000 the mass of ordinary commercial crystals — make possible a smooth, magma-like suspension, which ensures —

(1) Uniform deposition and "frosting" over infected areas

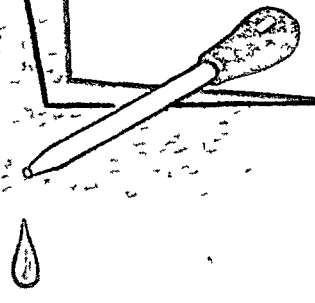
(2) Enhanced and prolonged therapeutic effect

*Trademark

II

Effective Vasoconstriction

'Paredrine' — the nearest approach to the ideal vasoconstrictor — possesses a *shrinking action more rapid*, complete and prolonged than that of ephedrine in equal concentration, without stinging, irritation, ciliary inhibition, or undesirable side effects



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Advance in Intranasal Sulfonamide Therapy

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Correct pH
(5.5-6.5)

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Paredrine-Sulfathiazole Suspension is strikingly effective, both with adults and children, in the treatment of nasal and sinus infections — particularly those secondary to the common cold Furthermore, it may often prevent dangerous sequelae, such as pulmonary flare-up, otitis media, pharyngitis, laryngitis, etc

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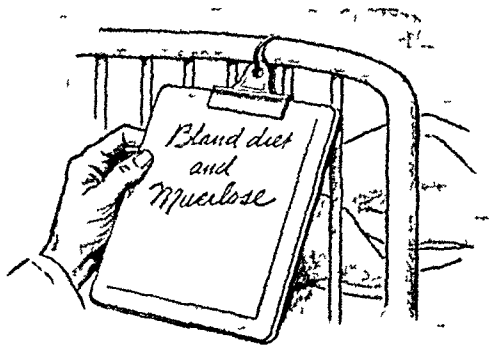

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supplying non-irritating, lubricating bulk
without vitamin absorption or
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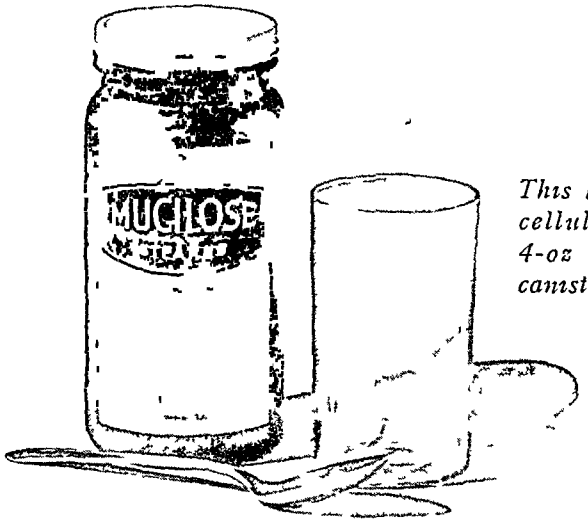

This highly purified hemicellulose is available in 4-oz bottles and 16-oz canisters

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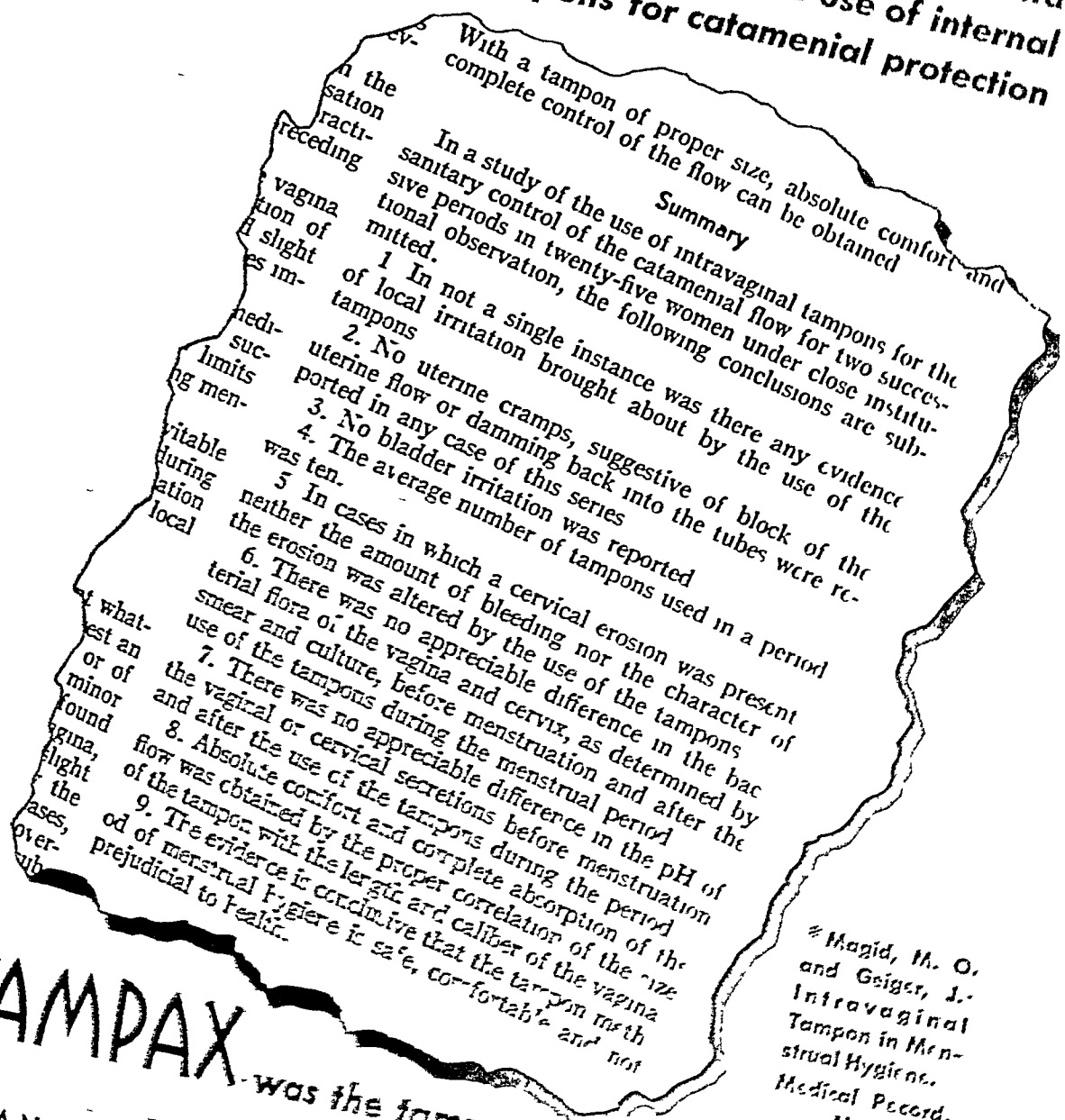
NEW YORK KANSAS CITY SAN FRANCISCO DETROIT, MICH WINDSOR, ONTARIO SYDNEY, AUSTRALIA AUCKLAND, NEW ZEALAND

*Latest report of controlled clinical and bacteriological findings on the use of internal menstrual tampons for catamenial protection



With a tampon of proper size, absolute comfort and complete control of the flow can be obtained

Summary

In a study of the use of intravaginal tampons for the sanitary control of the catamenial flow for two successive periods in twenty-five women under close institutional observation, the following conclusions are submitted.

1. In not a single instance was there any evidence of local irritation brought about by the use of the tampons
2. No uterine cramps, suggestive of block of the uterine flow or damming back into the tubes were reported in any case of this series
3. No bladder irritation was reported
4. The average number of tampons used in a period was ten.
5. In cases in which a cervical erosion was present neither the amount of bleeding nor the character of the erosion was altered by the use of the tampons
6. There was no appreciable difference in the bacterial flora of the vagina and cervix, as determined by smear and culture, before menstruation and after the use of the tampons during the menstrual period
7. There was no appreciable difference in the pH of the vaginal or cervical secretions before menstruation and after the use of the tampons during the period
8. Absolute comfort and complete absorption of the flow was obtained by the proper correlation of the size of the tampon with the length and caliber of the vagina
9. The evidence is conclusive that the tampon method of menstrual hygiene is safe, comfortable and not prejudicial to health.

* Magid, M. O. and Geiger, J. Intravaginal Tampon in Menstrual Hygiene. Medical Record, May, 1942

TAMPAX

was the tampon used in these studies

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533 College Street, Toronto, Ontario

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IRRITATIONS

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For your information Noxzema is a modernization of Carron Oil, fortified by adding Camphor, Menthol, Oil of Cloves and less than ½% of Phenol in a greaseless solidified emulsion Its reaction is slightly alkaline—the pH value being 7 4 Try it! See how much it adds to your comfort

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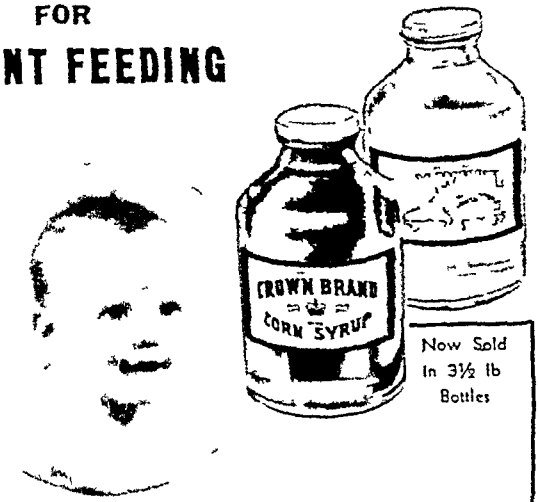
of Proven Excellence
FOR
INFANT FEEDING



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